ECO4CLOUD
USER MANUAL

ECO4CLOUD SOFTWARE V 1.0

With:

- VMware VSphere 4.x
- VMware VSphere 5.x

This document supports the version of each product listed and supports all subsequent versions until the document is replaced by a new edition. To check for more recent editions of this document, see http://www.eco4cloud.com/support.

The Eco4Cloud Web site also provides the latest product updates. If you have comments about this documentation, submit your feedback to info@eco4cloud.com.

Copyright © 2013-2014 Eco4Cloud. All rights reserved. This product is protected by Italian and international copyright and intellectual property laws. Eco4Cloud products are covered by one or more patents listed at http://www.eco4cloud.com/patents.

SUMMARY

Summary

About this book 1

Intended Audience 1

Document Feedback 1

Installation requirements 2

Hardware and Software compatibilities 2

Operating system and features 2

Installation on VMware Systems 3

Installation through ovf import 3

Best Practices 11

VApp Management 12

VMware Console 12

WEB Application 15

Updates management 22

Updates Logs. 26

Setup of a proxy update server 26

Setup of Eco4Cloud dashboard 27

Hypervisor 32

Mail Configuration 34

SMTP Configuration 34

Mail Recipients 35

Datacenter performances 37

Table perspective 37

Spatial perspective 37

Tree perspective 39

Chart perspective 40

Search 41

Consolidation constraints 42

SUMMARY

Clusters consolidation constraints ____ 43

Servers consolidation constraints ____ 44

Virtual machines consolidation constraints ____ 45

Appendixes ____ 46

Appendix A – Privileges ____ 46

Requirements ____ 46

Manual Role creation ____ 46

Automatic Role Creation by powershell script ____ 47

Appendix B – IMPORTANT NOTES about eco4cloud software ____ 58

About this book

This document, the Eco4Cloud User Manual, describes how to install and use the Eco4Cloud software components, monitor and manage the information generated by the components, build your Eco4Cloud datacenter environment, consolidate virtual machines within the datacenter environment, and set up rules for virtual machines, hosts and clusters included into the datacenter environment.

INTENDED AUDIENCE

The information presented in this manual is written for system administrators who are experienced Windows or Linux system administrators and who are familiar with VMware virtual machine technology and datacenter operations.

DOCUMENT FEEDBACK

Eco4Cloud welcomes your suggestions for improving our documentation. If you have comments, send your feedback to info@eco4cloud.com.

Installation requirements

Eco4Cloud is composed of two components: a java monitor and virtual machines consolidator, and a web dashboard. Eco4Cloud provides a vApp to simplify the software installation.

The vApp can be imported into a VMware Datacenter or into free, stand-alone systems, like VMware Player or VMware Server or non-free systems, like VMware Workstation.

HARDWARE AND SOFTWARE COMPATIBILITIES

Eco4Cloud Virtual Machine has a VMware version 7 virtual hardware, and has the following requirements.

Minimum System Requirements

- 4 GB of RAM memory;
- 1 processor;
- 10 GB of thin provisioned storage – SATA drive with a 15MBps throughput;
- 1 network card.

Recommended System Requirements

- 8 GB of RAM memory;
- 2 processor;
- 20 GB of thick provisioned, eager zeroed, storage – SSD drive with a 100MBps throughput;
- 1 network card.

Virtual systems supporting vApp are:

- ESX/ESXi 4.x - 5.x
- vCenter 4.x - 5.x
- vCloud Director 1.x
- Server 2.0
- Workstation 6.5.x - 7.x
- VMware Player.

OPERATING SYSTEM AND FEATURES

VApp is a Virtual Machine with an Ubuntu 10.04 Operating System with a single 64-bit processor, 4GB of RAM memory, a network card and a CD-ROM. Of course, virtual hardware can be modified according to new needs even after the installation.

Installation on VMware Systems

INSTALLATION THROUGH OVF IMPORT

Default Virtual Machine format is OVF 1.0, so compatibility is guaranteed with VMware vSphere 4.x and 5.x or VMware vCloud Director 1.0.

If requested, also OVF 0.9 is available, as it can be imported into legacy systems like ESX/ESXi 3.5 and VMware stand-alone products as Workstation 6.5.x or 7.x.

Moreover, ZIP format for free systems as VMware server and player is available, too.

The following procedure shows standard OVF 1.0 format import.

Choose the option "Deploy OVF Template" (Fig. 1), from "File" menu in the vSphere Client connected to vCenter. A wizard will start, including an automatic download of Eco4Cloud virtual application files.

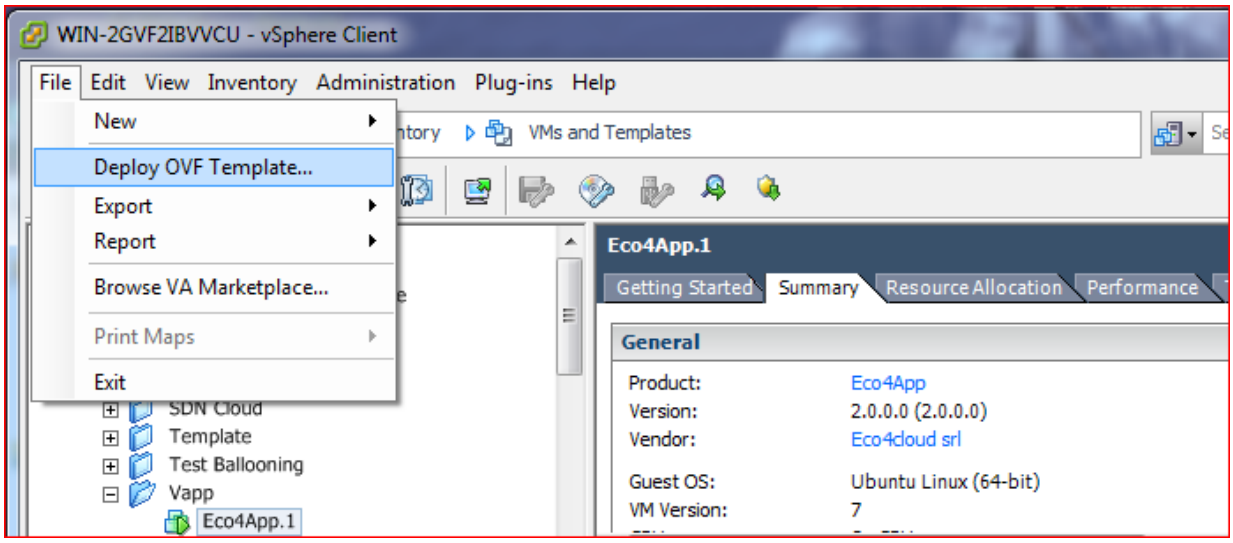


Fig.1 Deploy OVF Template wizard

In the first wizard window, the .ovf file URL for Internet download will be requested. Alternatively, it is possible to enter a folder from local file system or CD-ROM.

In the following procedure a URL will be used (Fig. 2).

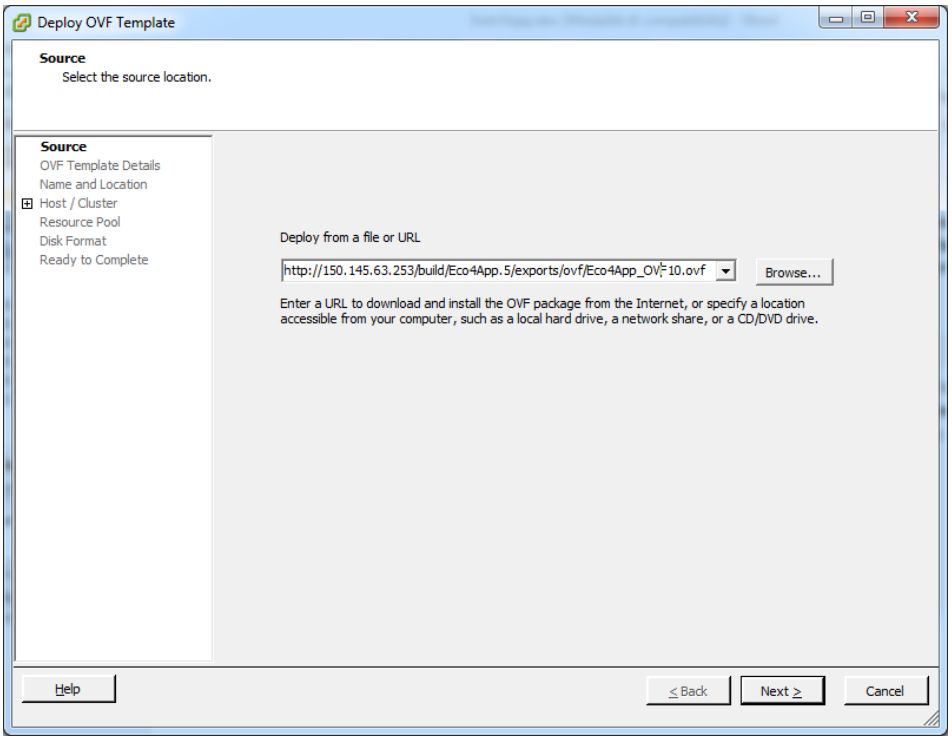

Deploy OVF Template
Source
Select the source location.
Source
OVF Template Details
Name and Location
Host / Cluster
Resource Pool
Disk Format
Ready to Complete
Deploy from a file or URL
http://150.145.63.253/build/Eco4App.5/exports/ovf/Eco4App_OVF10.ovf
Browse...
Enter a URL to download and install the OVF package from the Internet, or specify a location accessible from your computer, such as a local hard drive, a network share, or a CD/DVD drive.
Help
< Back
Next >
Cancel

Fig. 2 Selecting .ovf file source

Clicking on “Next” button, a first virtual machine features recap window will be shown (Fig.3).

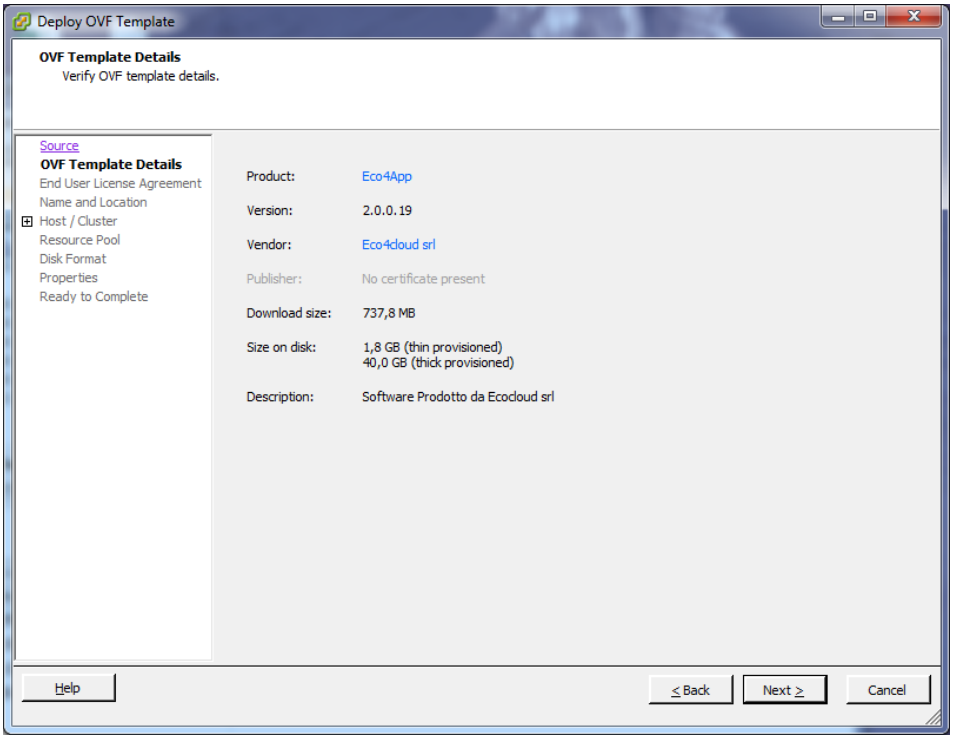


Fig.3 OVF template details.

In the following window it is possible to accept End User License Agreement by clicking “Accept” and then going ahead clicking on the “Next” button (Fig.4).

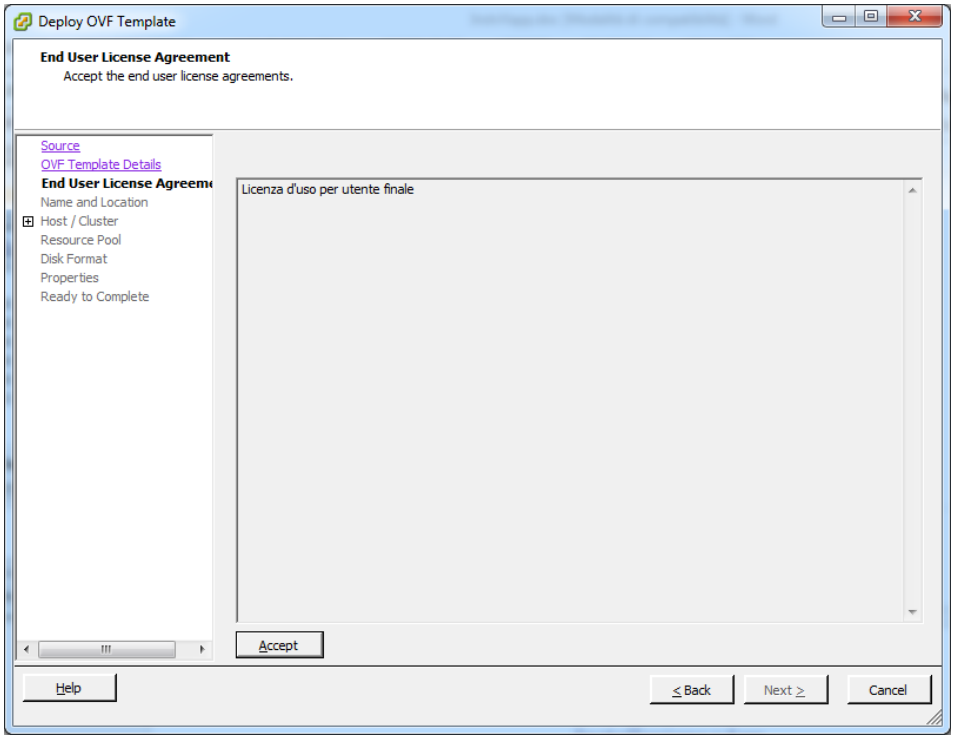


Fig.4 End User License Agreement.

The next step is the choice of Eco4Cloud virtual machine name and the datecenter wherein it must be deployed (Fig. 5).

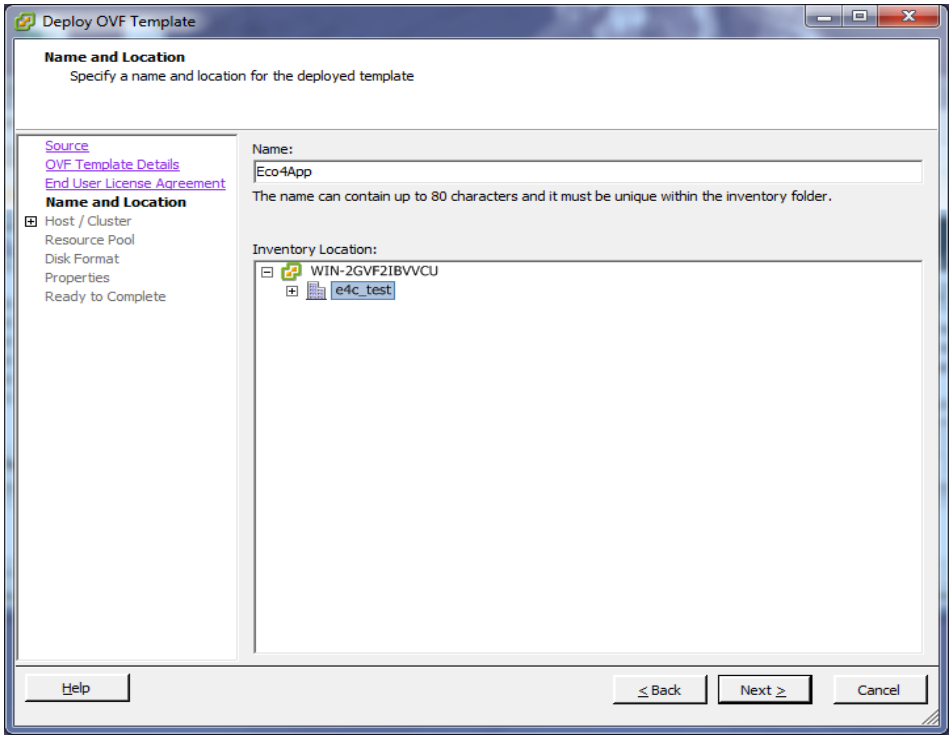


Fig.5 virtual machine name and datecenter.

When datacenter is selected, it is possible to choose the cluster where the virtual machine must be deployed (Fig. 6) and the specific host within the chisen cluster (Fig. 7).

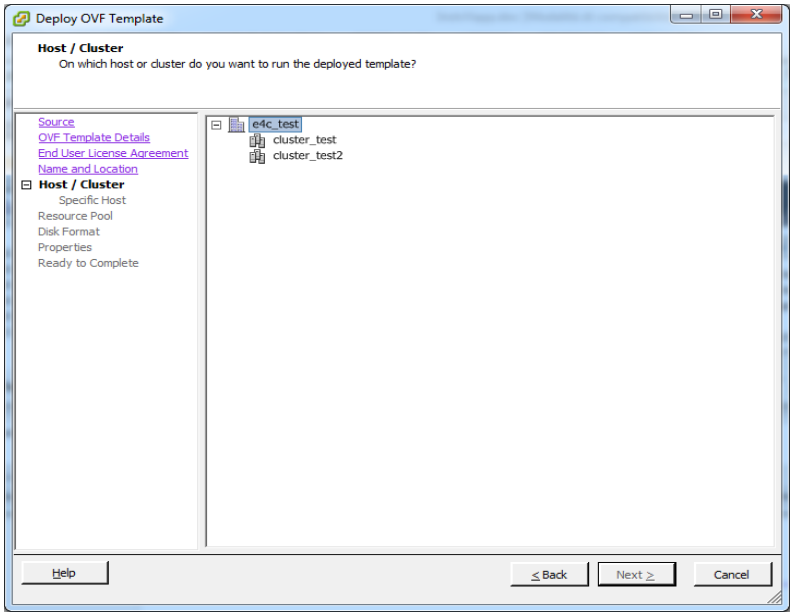


Fig.6 Cluster choice for the Eco4Cloud VM

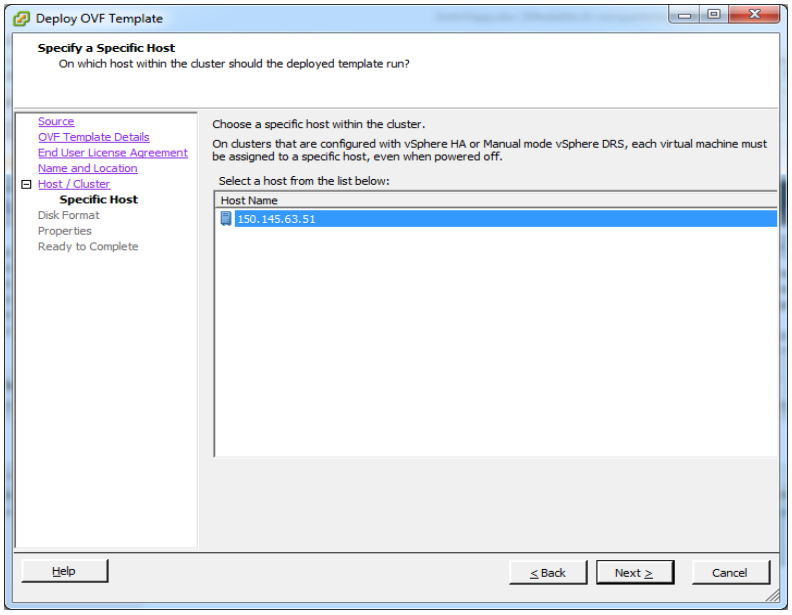

Deploy OVF Template
Specify a Specific Host
On which host within the cluster should the deployed template run?
Source
OVF Template Details
End User License Agreement
Name and Location
Host / Cluster
Specific Host
Disk Format
Properties
Ready to Complete
Choose a specific host within the cluster.
On clusters that are configured with vSphere HA or Manual mode vSphere DRS, each virtual machine must be assigned to a specific host, even when powered off.
Select a host from the list below:
Host Name
150.145.63.51
Help
< Back
Next >
Cancel

Fig.7 Host choice for the Eco4Cloud VM

Furthermore it is possible to insert the datastore where virtual disks will be stored, and their format (Fig.8 e Fig. 9).

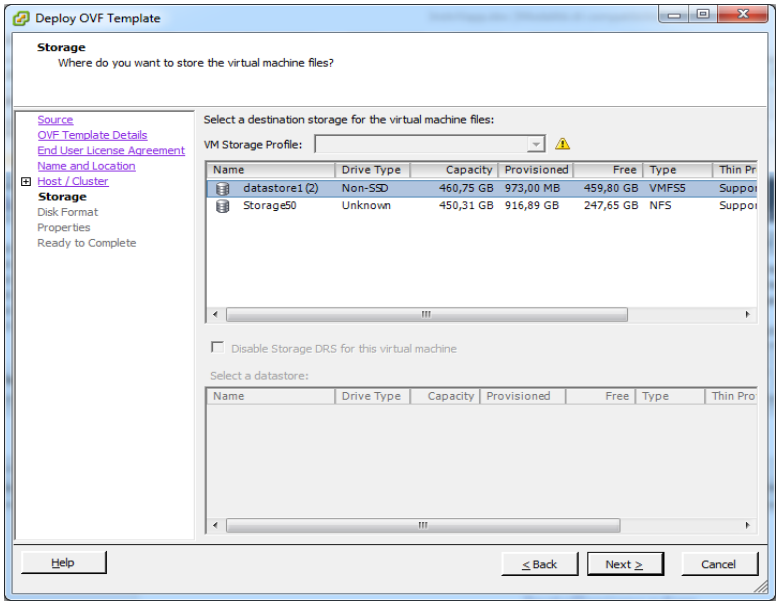


Fig.8 Storage choice for the Eco4Cloud VM

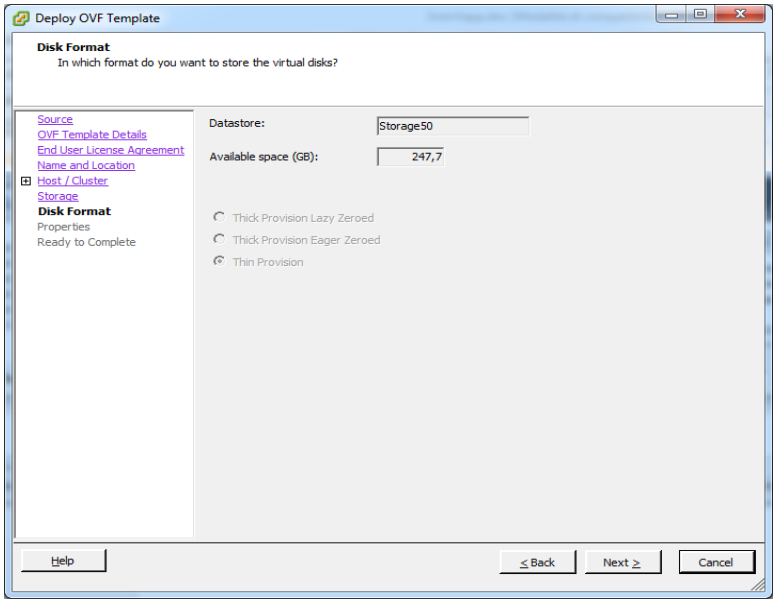


Fig.9 Storage format for the Eco4Cloud VM

Clicking again on “Next” button, the choice of network parameters is available (Fig. 10). It is noteworthy that, leaving blank fields, DHCP, if previously configured in the network, will take charge of setting network parameters automatically.

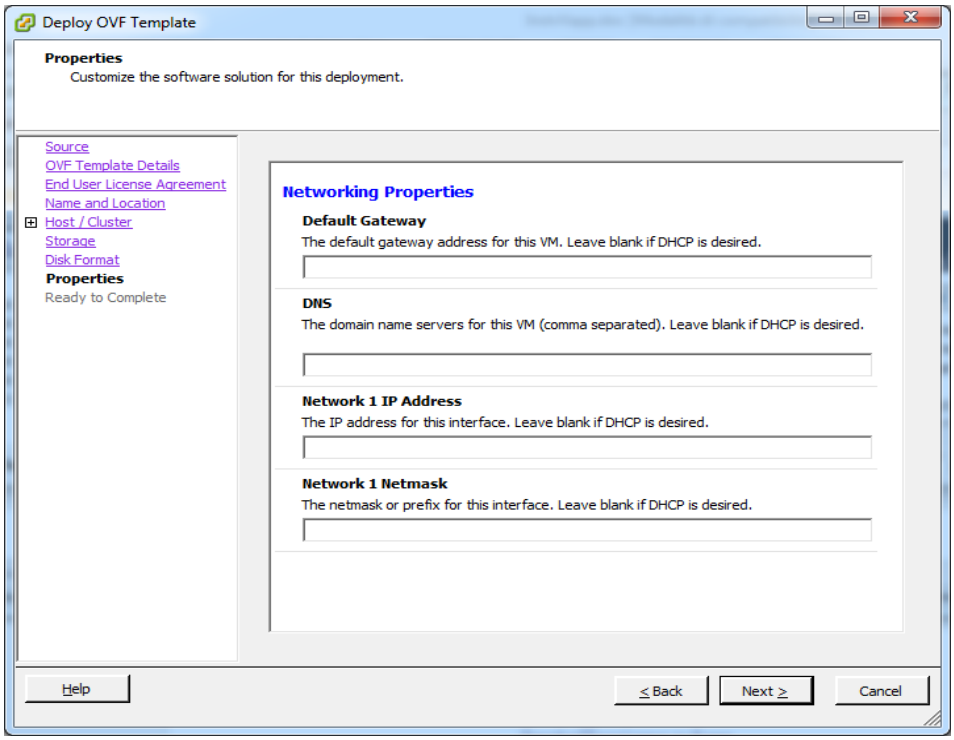

Deploy OVF Template
Properties
Customize the software solution for this deployment.
Source
OVF Template Details
End User License Agreement
Name and Location
Host / Cluster
Storage
Disk Format
Properties
Ready to Complete
Networking Properties
Default Gateway
The default gateway address for this VM. Leave blank if DHCP is desired.
DNS
The domain name servers for this VM (comma separated). Leave blank if DHCP is desired.
Network 1 IP Address
The IP address for this interface. Leave blank if DHCP is desired.
Network 1 Netmask
The netmask or prefix for this interface. Leave blank if DHCP is desired.
Help
< Back
Next >
Cancel

Fig.10 Network properties

Finally, clicking on the “Finish” button, the import procedure will start (Fig. 11).

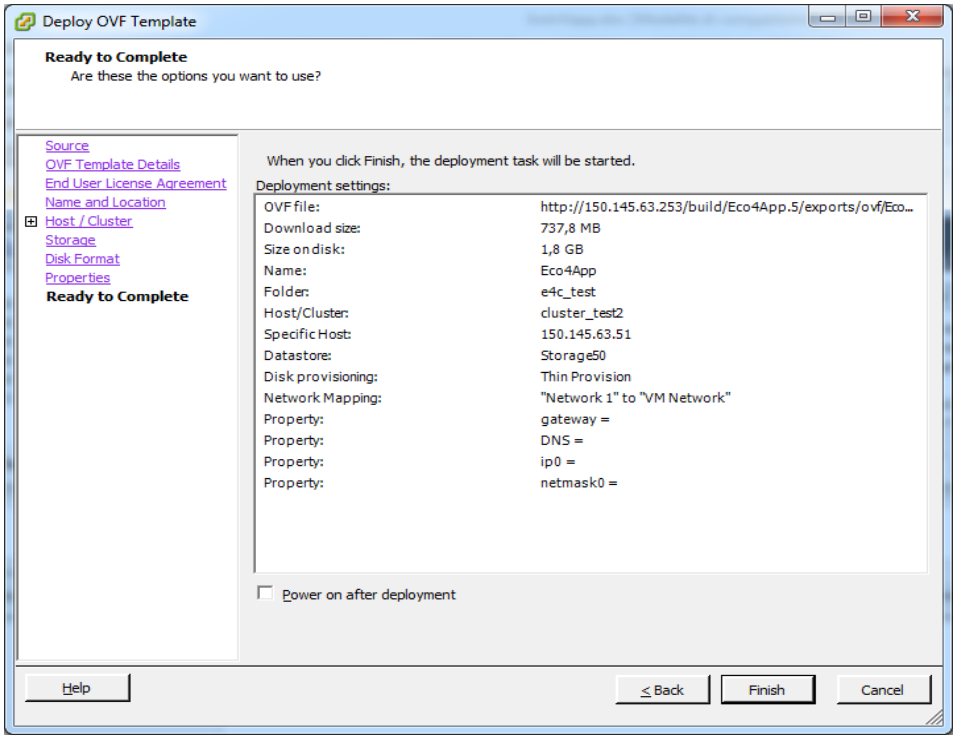


Fig.11 Final configuration recap.

BEST PRACTICES

Once Eco4Cloud virtual appliance starts working, network communication starts between the appliance and the vCenter. For performances reasons, it is advisable to run Eco4Cloud and vCenter on the same physical machine.

In order to do that, it is possible to set affinity rules between the virtual appliance and the virtual machine where vCenter runs. Depending on vCenter installation, if the vCenter has been installed directly on a physical host, an affinity rule can be set between E4C appliance and the physical host running the vCenter.

If affinity rules are not available, it is also possible to disable consolidation of E4C virtual appliance (and optionally of the vCenter virtual machine itself) via E4C dashboard, as described in section “Virtual machines consolidation constraints”.

VApp Management

VMWARE CONSOLE

After importing Eco4Cloud vApp into vCenter, in needs to be powered on. The first boot can be slower because the virtual machine has to install possible new Operating System updates and configure the environment. Once the boot is completed, the starting window, the console, will appear (Fig. 12).

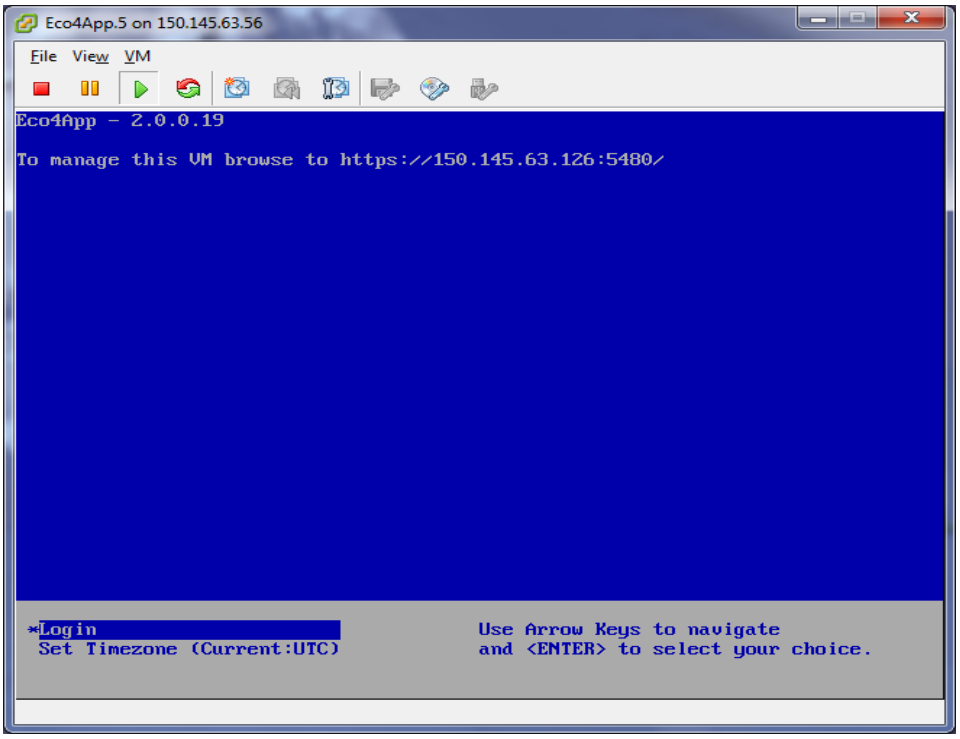


Fig.12 Console.

VAPP MANAGEMENT

The vApp can be managed via browser, inserting the IP address, as suggested in the screen shown in Figure 12. Alternatively, the console let the user to log in into the Operating System (Ubuntu 10.4.4) or to modify time zone settings. Choosing Set Timezone the screen in Figure 13 will appear. The following screens show how to modify the time zone.

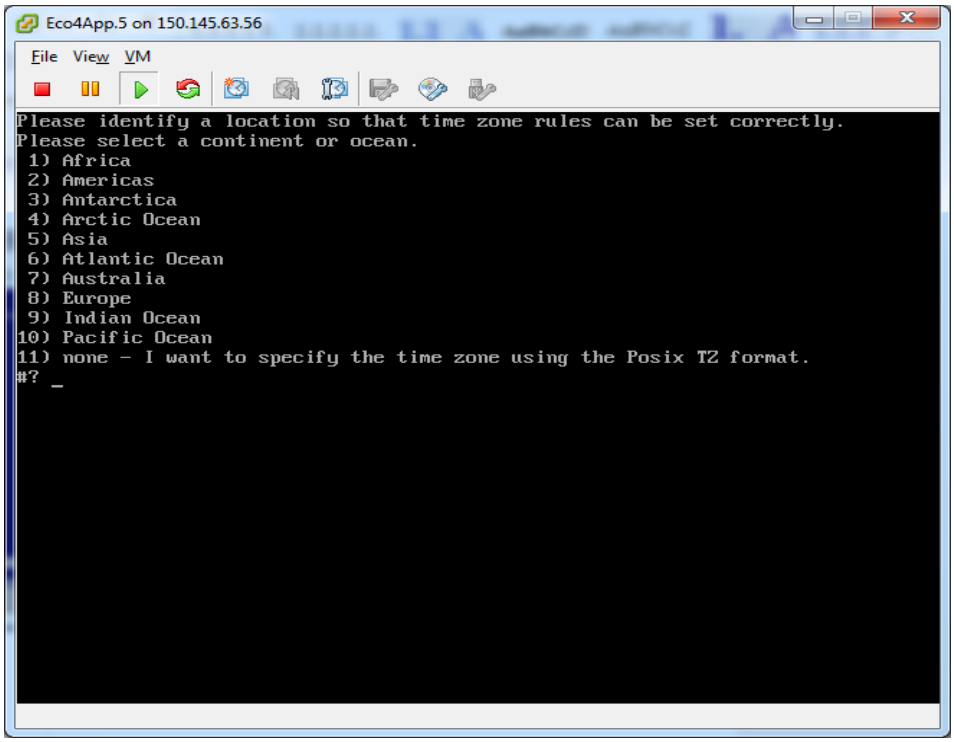

Eco4App.5 on 150.145.63.56
File View VM
Please identify a location so that time zone rules can be set correctly.
Please select a continent or ocean.
1) Africa
2) Americas
3) Antarctica
4) Arctic Ocean
5) Asia
6) Atlantic Ocean
7) Australia
8) Europe
9) Indian Ocean
10) Pacific Ocean
11) none - I want to specify the time zone using the Posix TZ format.
#? _

Fig.13 Time zone modify.

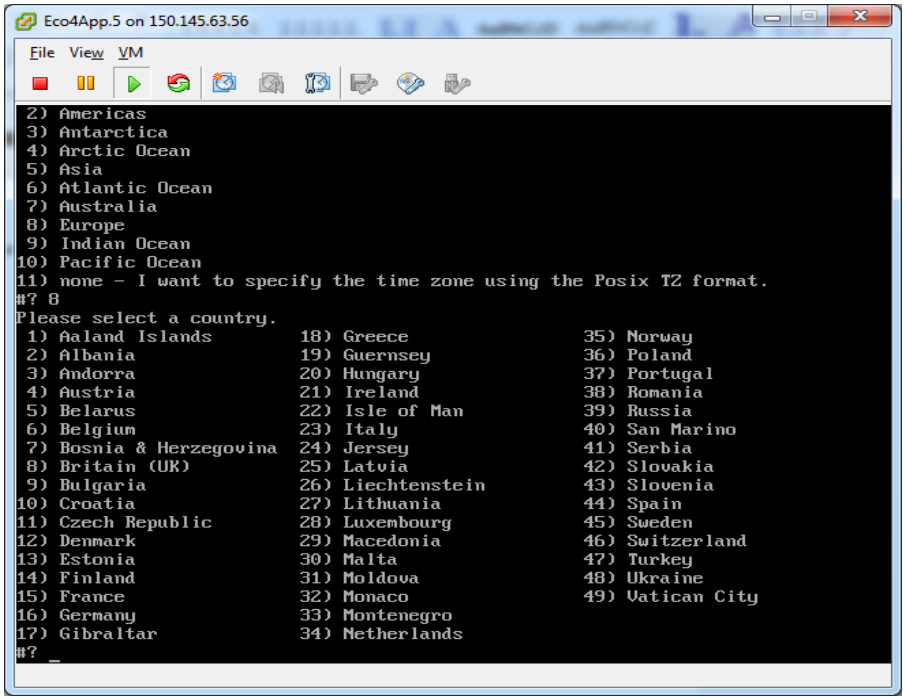


Fig.14 Time zone modify - 2.

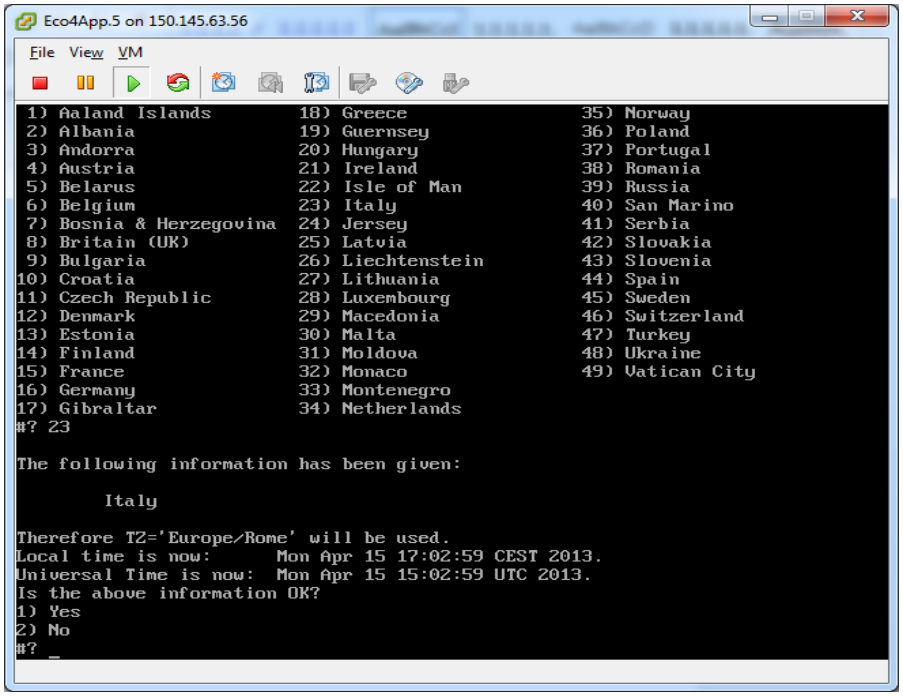


Fig.15 Location choice.

VAPP MANAGEMENT

WEB APPLICATION

The vApp can be managed via browser, inserting the IP address, as previously suggested in the screen shown in Figure 12.

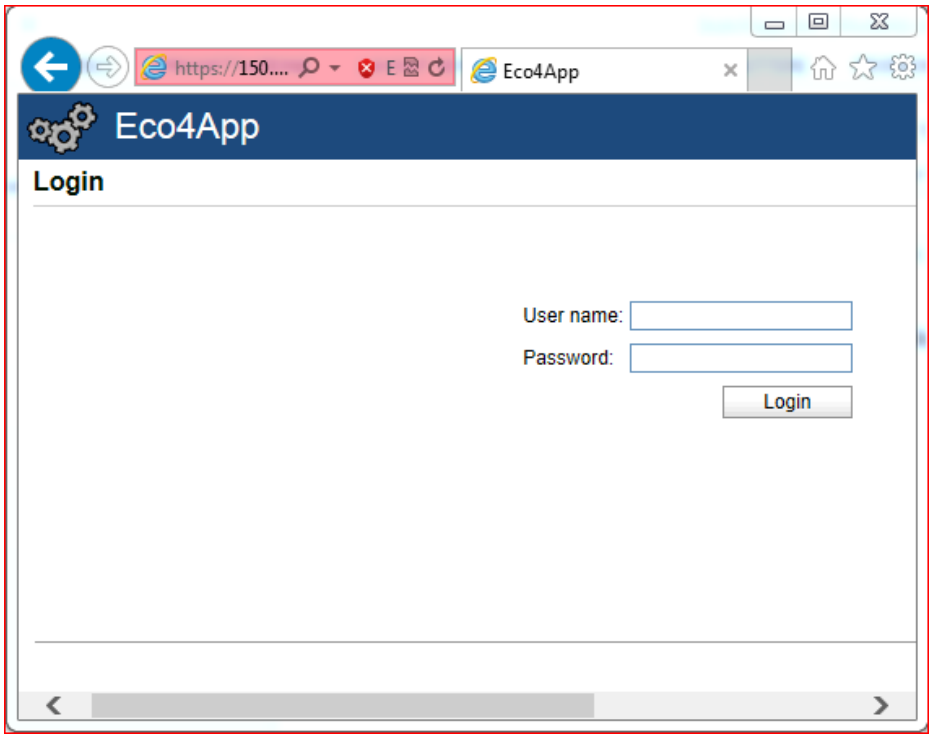


Fig.16 Initial screen for login.

Once the login is completed, the initial vApp screen appears, with three tabs.

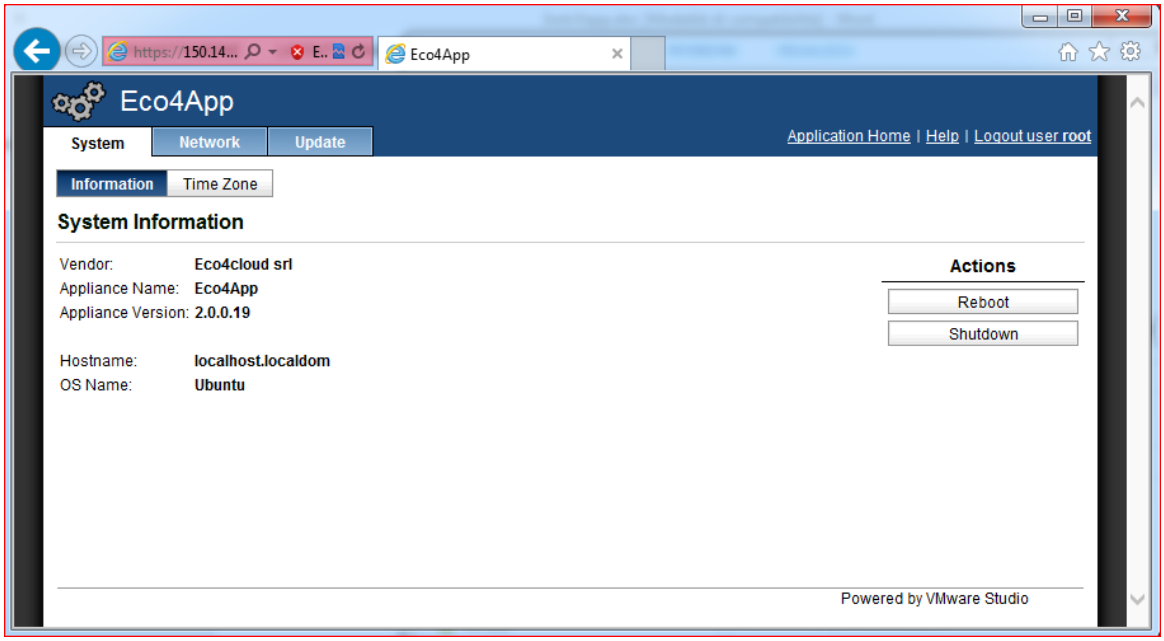


Fig.17 Initial page for vApp configuration

The first tab (default) is “System”, wherein all main information on software version, virtual machine name and operating system. On the right, one can find “Actions” button, useful to reboot or shutdown the vApp.

Clicking on “Time zone” button, it is possible to modify the assigned time zone. After entering all the desired settings modifications, it is necessary to press button “Save Settings”.

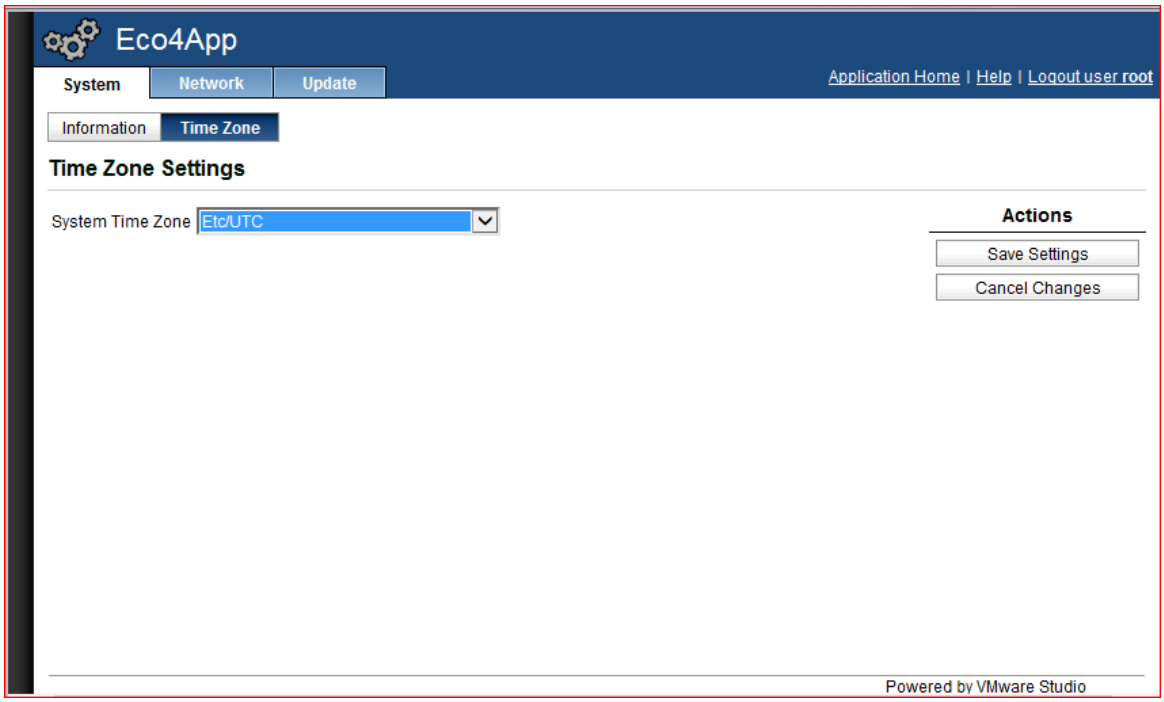


Fig.18 Time zone modify page

The second tab (Network) is useful to configure network, or better, to modify network settings compared to those entered during vApp installation (Fig. 10).

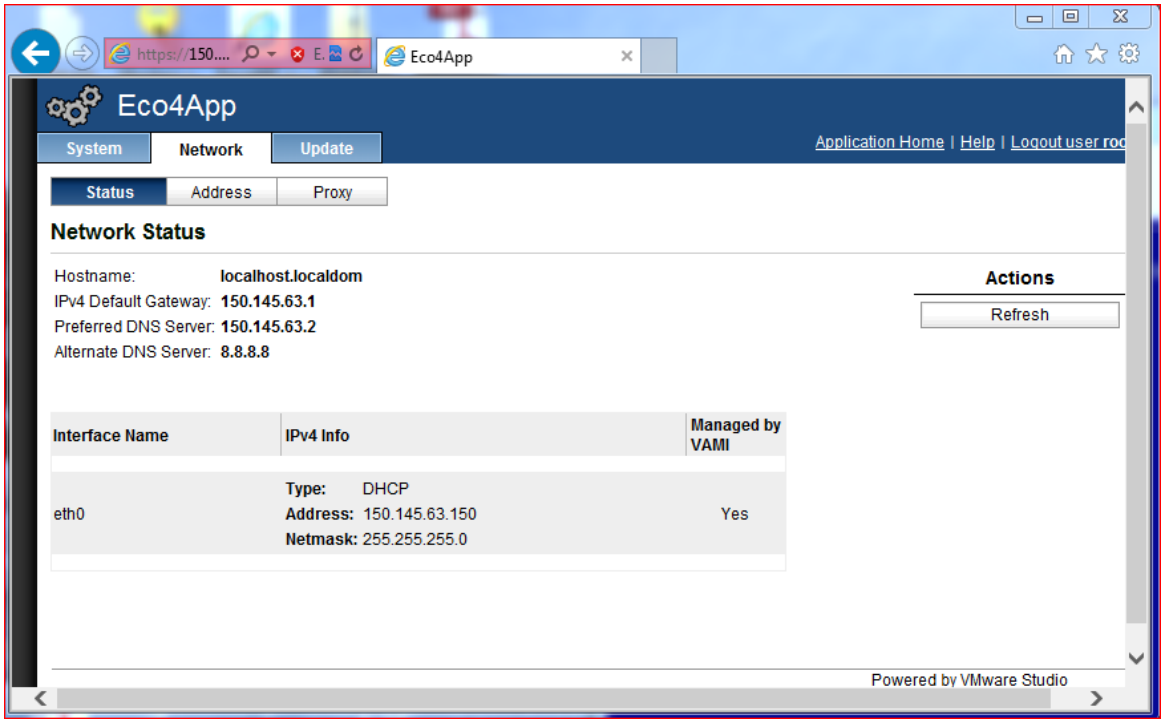


Fig.19 Network Settings

In the “Status” page, network settings currently used by vApp are available, as IP address, DNS address, etc.

Modifying settings is possible by clicking on the “Address” button (Fig. 20).

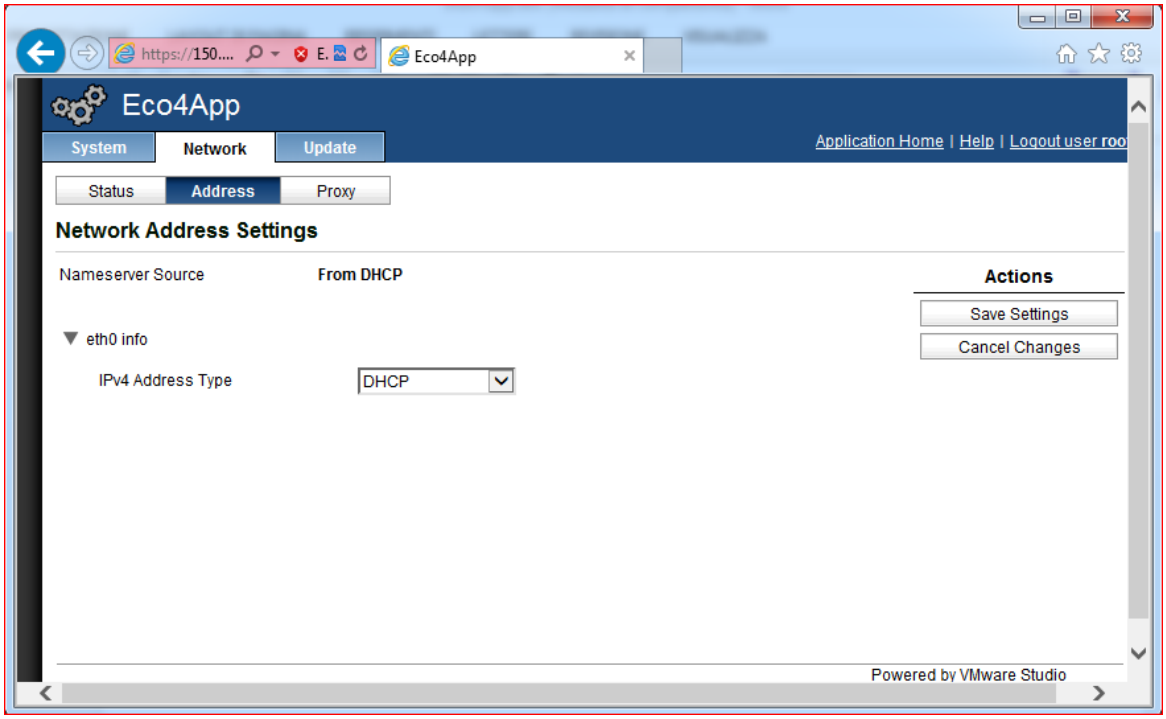


Fig.20 Network Settings using DHCP

In the example in Figure 20, the DHCP automatically sets up network configuration, but it is possible to configure statically the network choosing a different option in the dropdown menu.

In Figure 21 it is shown how modify the default gateway, the DNS address, the IP address, the subnet mask, and the hostname.

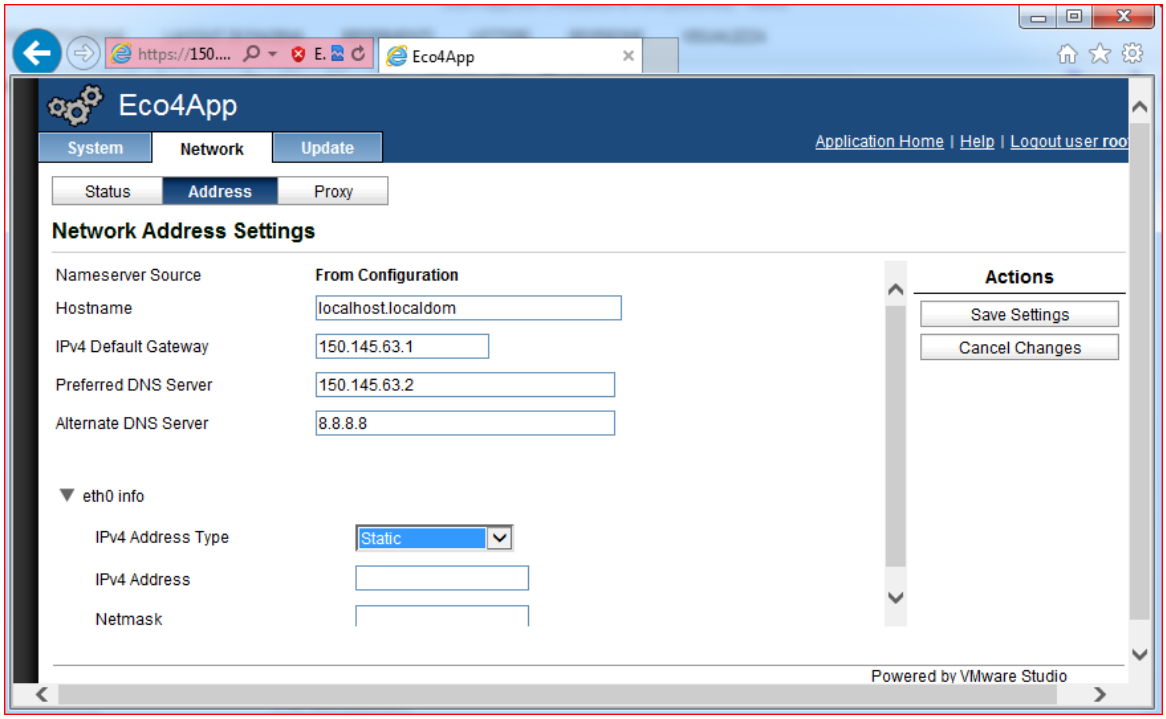


Fig.21 manual network settings

The last button “Proxy” allows configuring the vApp (Fig. 22) in order to surf the internet using a proxy server. To do so, check the option “Use a proxy server” and enter further requested information as IP address, port, user name and password. Finally, save all new information clicking “Save Settings”.

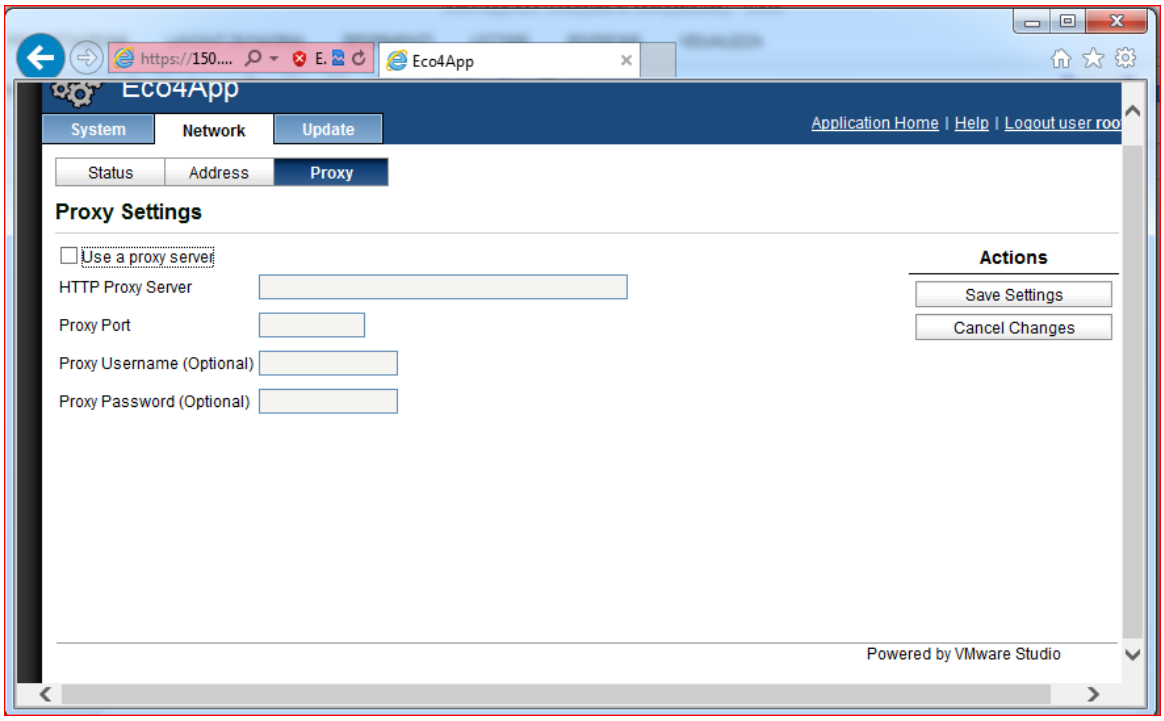


Fig.22 Proxy server settings

Updates management

One of the best features of vApp is that it can be updated. The updates may include, for example, the addition of modules of the operating system or running a particular configuration script or changes in the Eco4Cloud software.

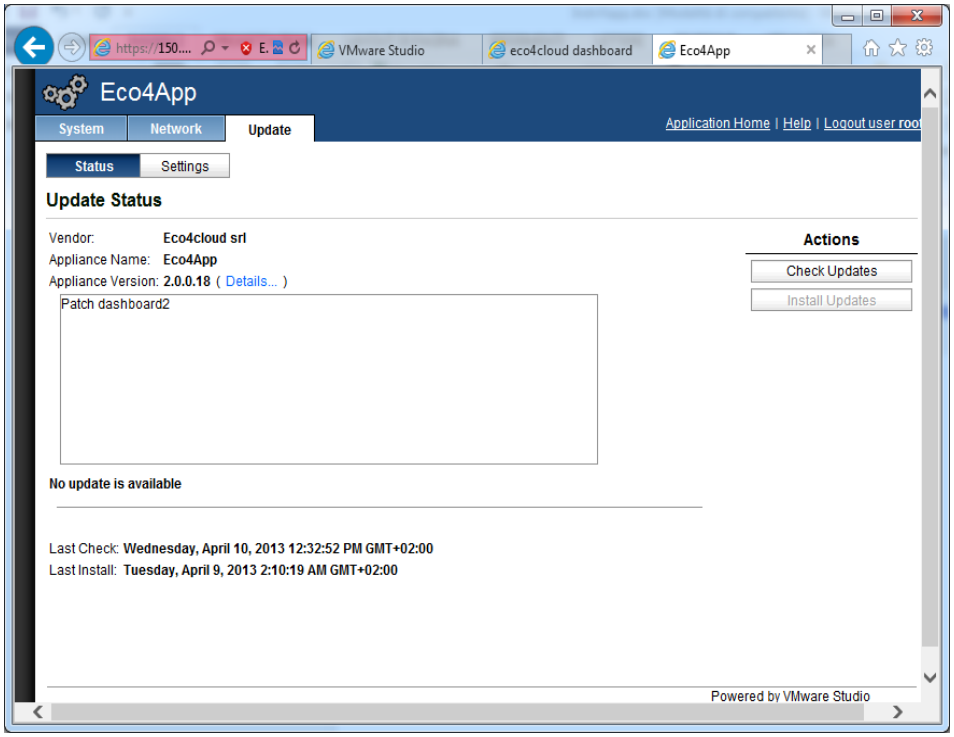


Fig.23 Update Status and appliance version.

UPDATES MANAGEMENT

By clicking on the “Update” tab, you will see a summary page on the application version. Before you can check for new updates you need to click on the “Settings” button and verify all the parameters.

The configuration page allows you to automate or semi-automate or manual leaving all the updates management. By default, automatic updates are not enabled (Fig. 24).

You can change the settings and choose "Automatic check for updates" with which the vApp periodically checks whether new updates have been published, but not install them. The installation is carried out manually by clicking on the button "Install updates" from the first screen (Fig. 23). Finally, if you want to fully automate you have to select "Automatic check and install updates" and choose the frequency and time.

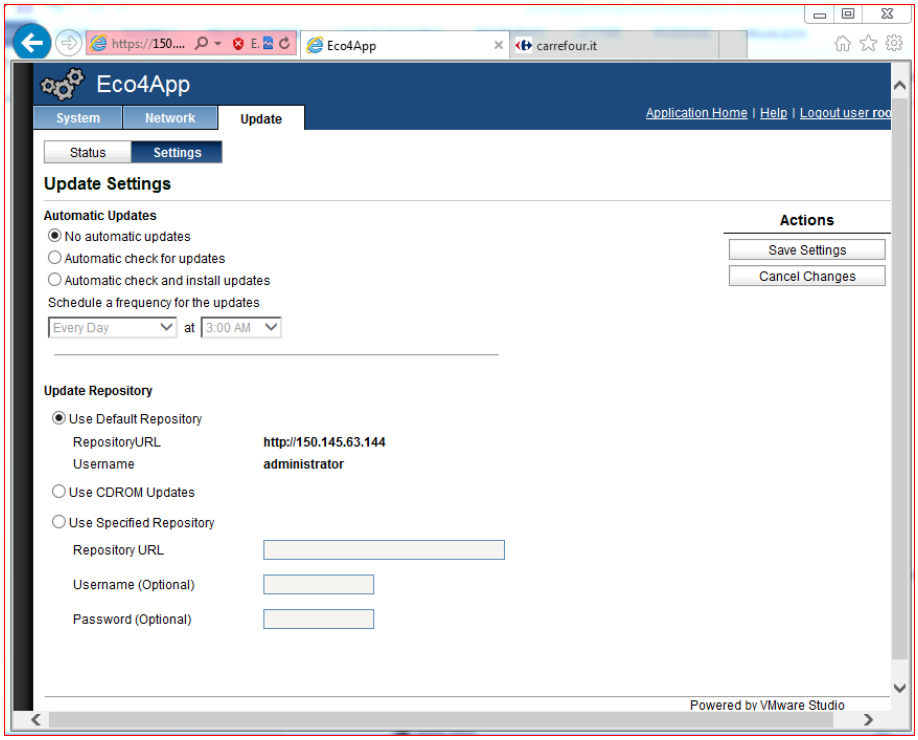


Fig.24 Automatic updates management

At the bottom of the screen you have to choose the update repository. By default it is configured eco4cloud company repository server. Otherwise, if the vApp does not have internet access, Eco4Cloud will send a CD-ROM with the updates, and then you need to select “Use CD-ROM Updates”. Finally, if the URL of the repository changes, you will need to select “Use Specified Repository”, writing the new url and login credentials.

As stated above, for manual installation or a manual check for updates, click on the “Status” button back to the previous page, and then click “Check Updates” and “Instll Updates” (Fig.25). If new updates are available, anotify appears with the words “Available Updates” and the serial number of the new software version.

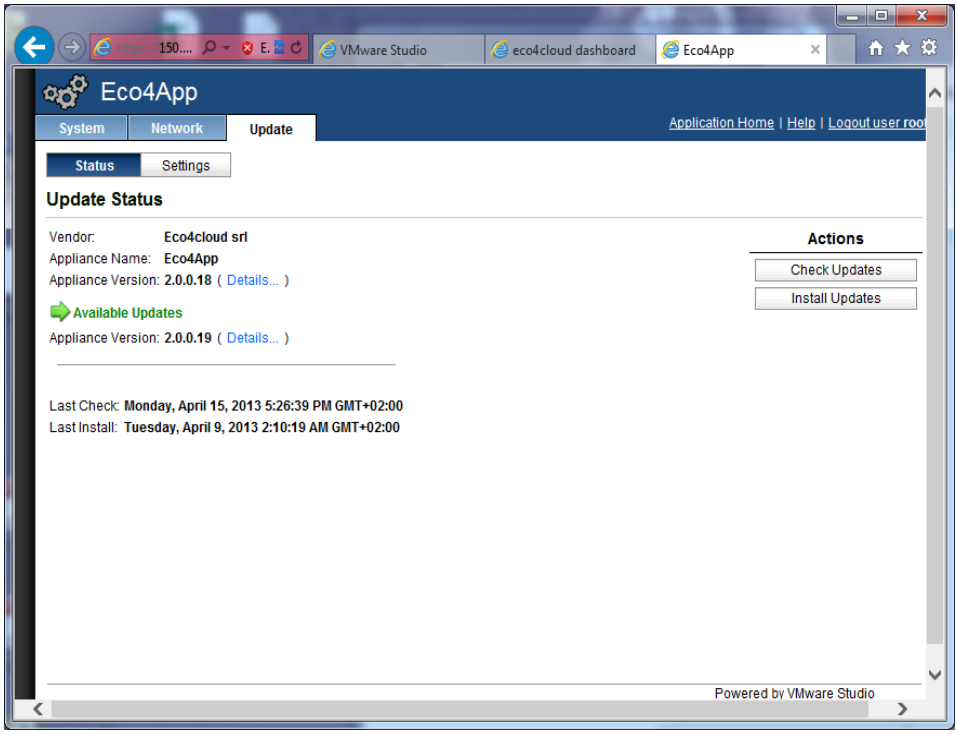


Fig.25 updates check

Figures 26 and 27 illustrate the process of updates installation.

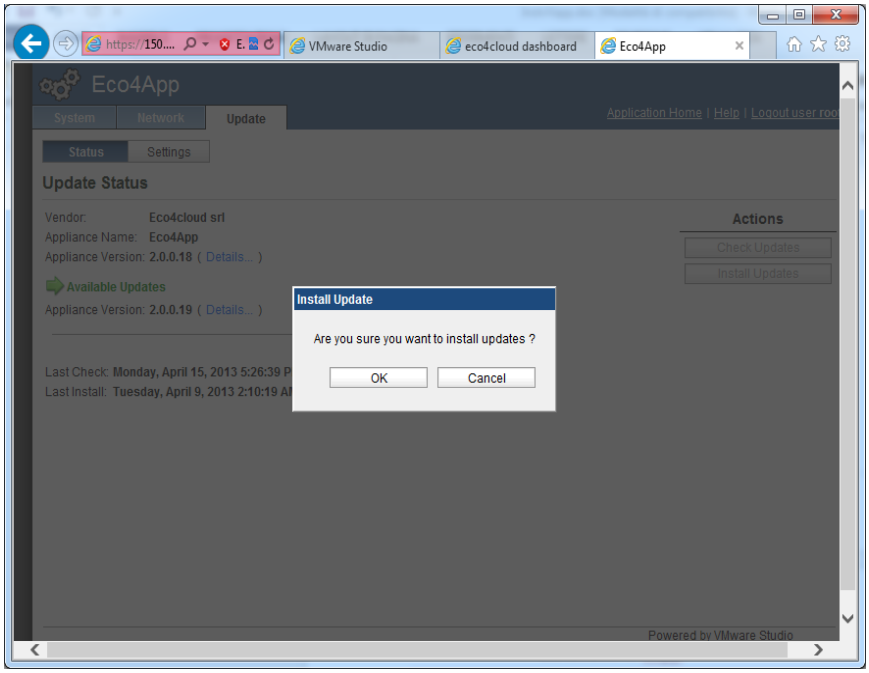


Fig.26 Update process

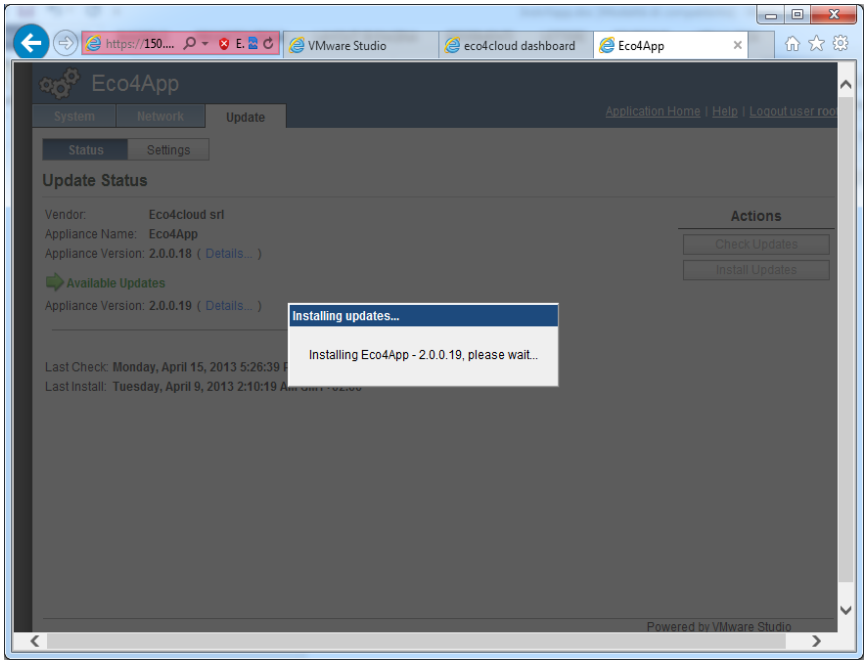


Fig.27 Updates installation

UPDATES MANAGEMENT

UPDATES LOGS.

If for some reason the updates were not installed properly will need to check the logs. In order to do this, you need to access the console or via ssh to vApp and read files updatecli.log and vami.log in the */opt/vmware/var/log/Vami* folder.

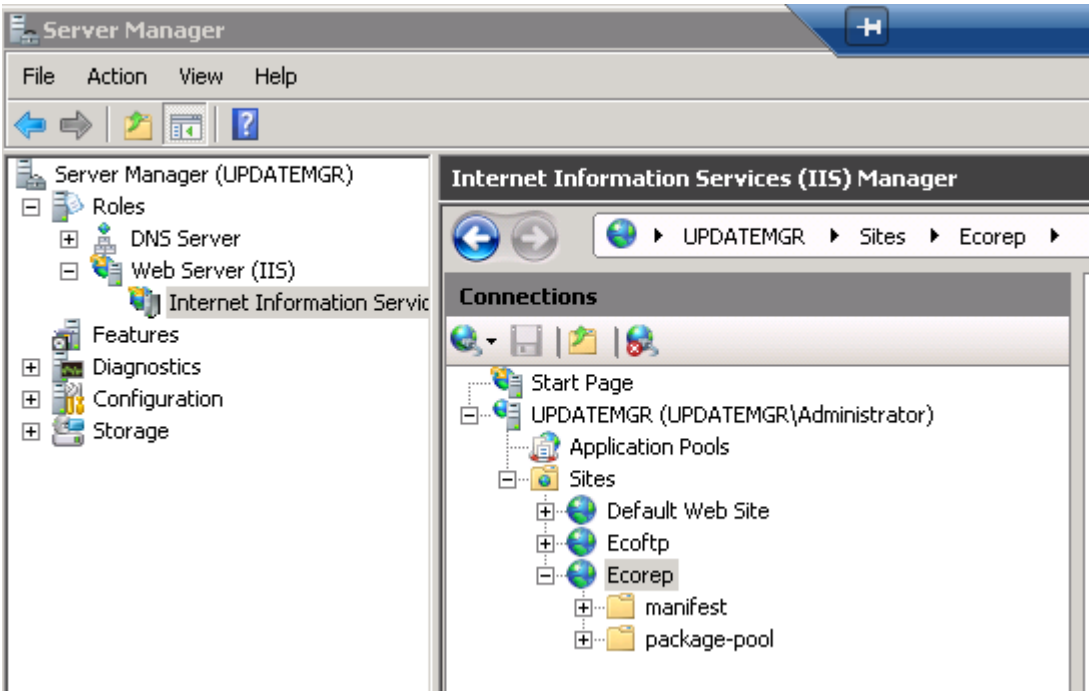
SETUP OF A PROXY UPDATE SERVER

It's possible to maintain independently a proxy server for Eco4cloud vApp updates management. The only prerequisite is to have a web server available. In case of Windows environments the web server may be **IIS** web server, in case of Linux environments this may be **Apache** web server.

Once you have successfully configured the web server, simply copy the two folders for managing updates, **manifest** and **package-pool**, in the web server root folder. These will be sent in a zip file. The customer has to properly explode it in the root of the web sever. The example below shows a possible configuration.

A "Ecorep" site was created and the two folders, **manifest** and **package-pool**, copied in it. In this example the Ecorep site is available via the url http://<name-of-server> or http://<server-ip-address>.

All the network communications will take place thorugh HTTP protocol on TCP port 80.



Setup of Eco4Cloud dashboard

Once Eco4Cloud virtual appliance is installed, it is possible to access it remotely, via browser, entering the IP address of the virtual machine, either assigned by DHCP, or entered manually.

The first requirement is to log in the Eco4Cloud dashboard, filling the module shown in Figure 28. If there are no registered users, it is necessary to sign up a new user, clicking on “Want to register?” button.

Each Eco4Cloud virtual appliance comes with a default admin user. Contact support@eco4cloud.com to gain access to the default user.

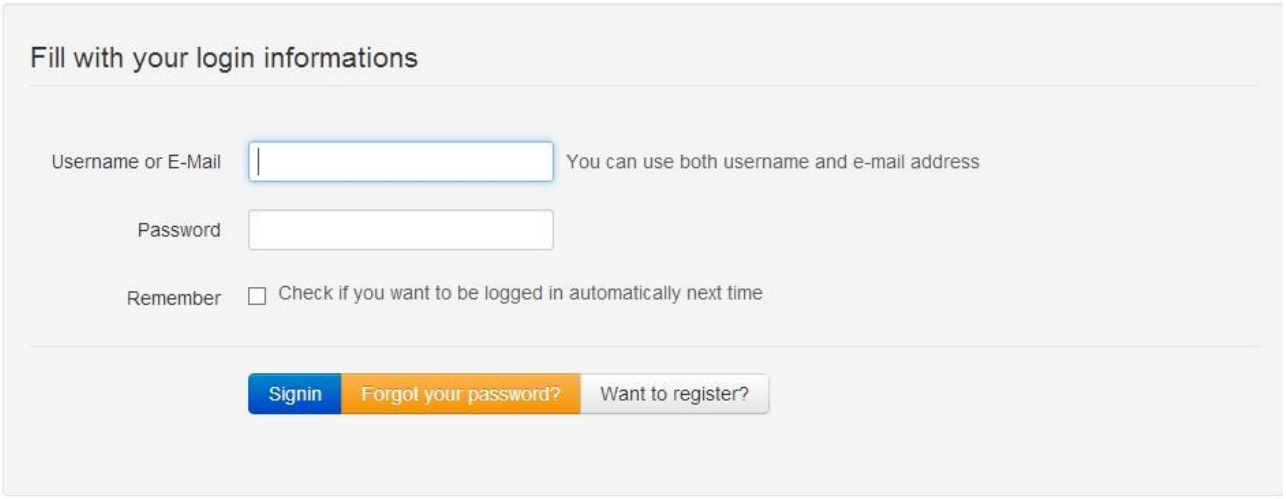

Fill with your login informations
Username or E-Mail
You can use both username and e-mail address
Password
Remember
Check if you want to be logged in automatically next time
Signin
Forgot your password?
Want to register?

Fig. 28 Eco4Cloud Dashboard Login

SETUP OF ECO4CLOUD DASHBOARD

When the user logs into the dashboard, he is redirected to the home page where, selecting the dropdown menu shown in Figure 29, can access the full list of registered data centers shown in Figure 30.

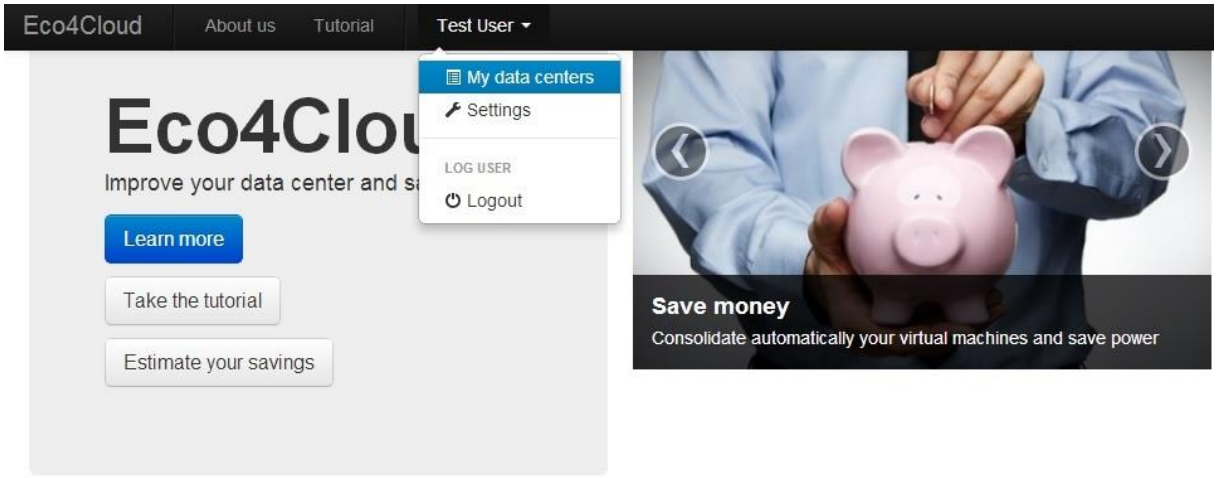


Fig. 29 Dashboard Home

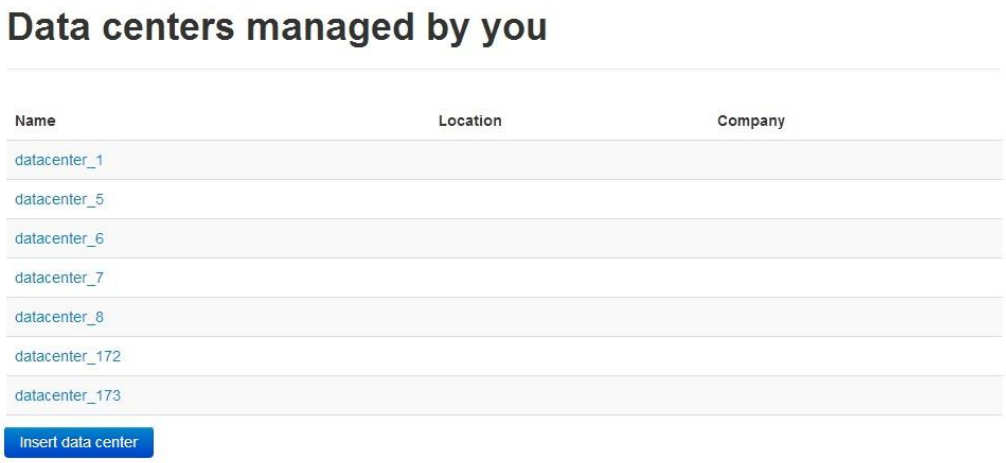


Fig. 30 Registered Data centers list

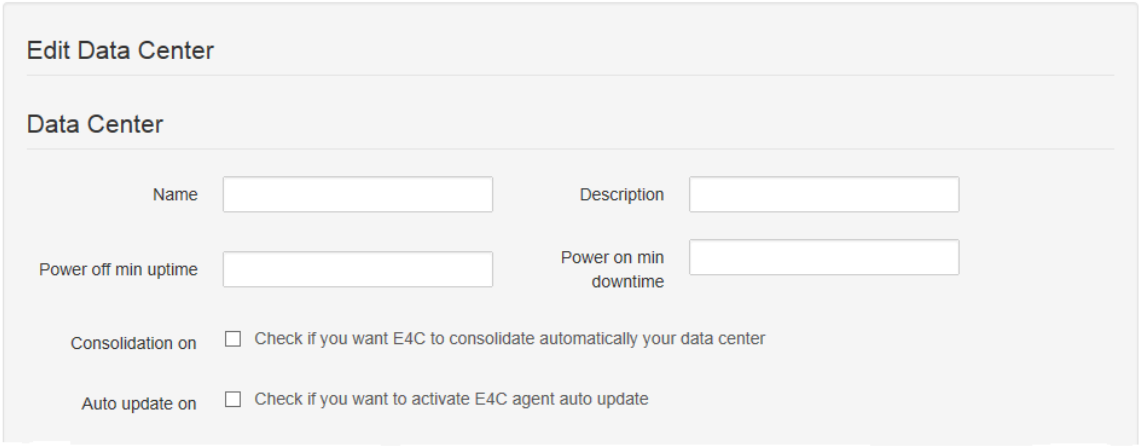
SETUP OF ECO4CLOUD DASHBOARD

If no data centers where registered into the Eco4Cloud dashboard, or if any data centers are still missing, it is necessary to register them into the dashboard.

Requested information, as of Figure 31, is in the Edit data Center section:

- Name and description – in order to identify the specific data center;
- Consolidation on – activate or deactivate the virtual machines consolidation process (default: no);
- Auto update on – activate or deactivate vApp automatic update (default: no);
- Power Off min uptime – minimum number of minutes of activity before a host can be powered off (default: 120);
- Power On min downtime – minimum number of minutes of inactivity before a host can be powered on (default: 120).

The last two parameters are useful to avoid too frequent power on / off events.


Edit Data Center
Data Center
Name
Description
Power off min uptime
Power on min downtime
Consolidation on
Check if you want E4C to consolidate automatically your data center
Auto update on
Check if you want to activate E4C agent auto update

Requested information in the Hypervisor section:

- Hypervisor Address, user and password – information needed to properly connect the dashboard and the underlying virtualization platform
- Power Off min uptime – minimum number of minutes of activity before a host can be powered off;
- Power On min downtime – minimum number of minutes of inactivity before a host can be powered on;
- VM Address: Virtual machine ip address on which eco4cloud service is running

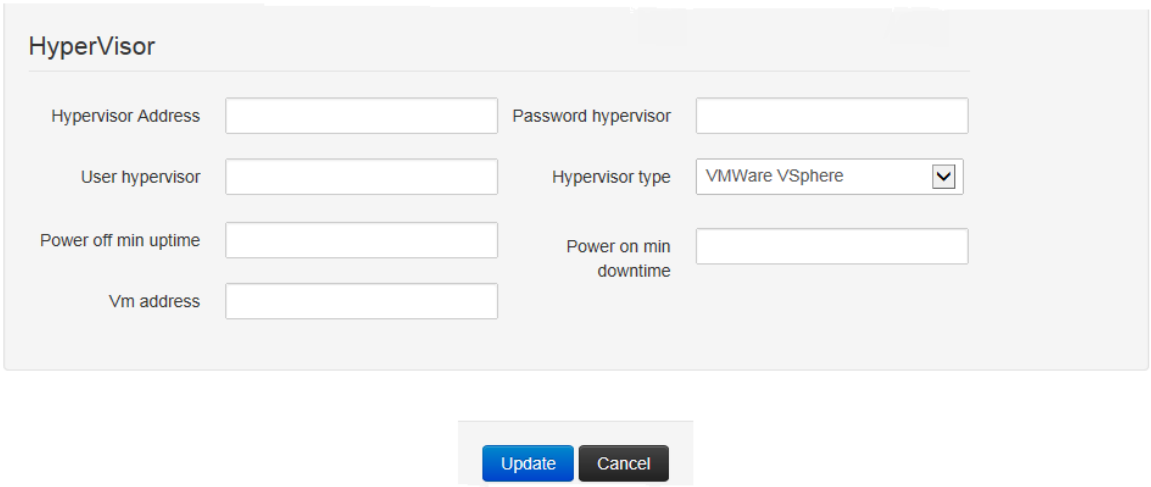


Fig. 31 Insert new data center

Once the data center is inserted, activation is requested in the data center page (Fig. 32). The configuration tab shows a link to Eco4Cloud website, where it is possible to obtain a license. The website will produce e trial license that can be extended at a later stage, and to be inserted into the activation form.

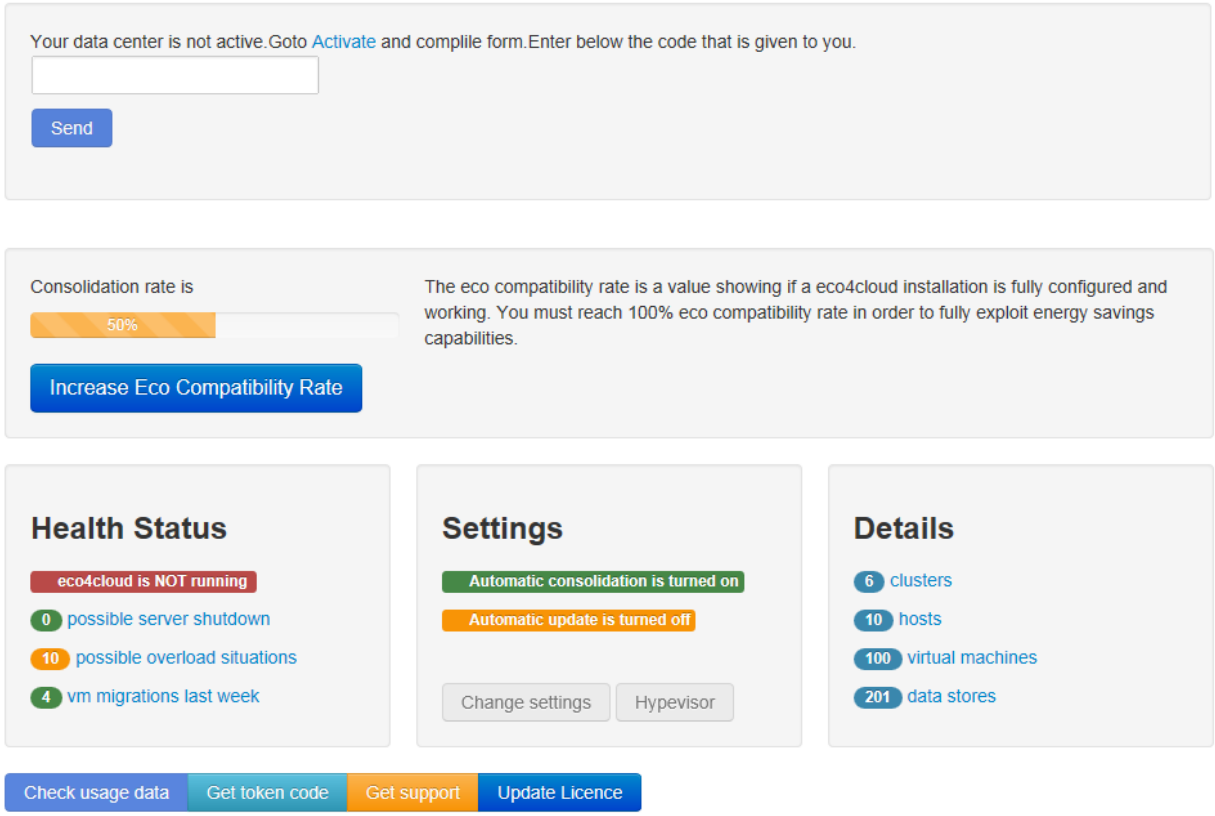

Your data center is not active.Goto Activate and complile form.Enter below the code that is given to you.
Send
Consolidation rate is
50%
The eco compatibility rate is a value showing if a eco4cloud installation is fully configured and working. You must reach 100% eco compatibility rate in order to fully exploit energy savings capabilities.
Increase Eco Compatibility Rate
Health Status
eco4cloud is NOT running
0 possible server shutdown
10 possible overload situations
4 vm migrations last week
Settings
Automatic consolidation is turned on
Automatic update is turned off
Change settings
Hypevisor
Details
6 clusters
10 hosts
100 virtual machines
201 data stores
Check usage data
Get token code
Get support
Update Licence

Fig. 32 Data center Activation

The second half of Figure 32 shows the home page of a datacenter. Here the user can check datacenter details, change settings, and verify datacenter health status.

After filling the form shown in figure 33, the datacenter license code will be sent to the mail address inserted into the same form. Final step is inserting the license code into the form already shown in first half of figure 32. The datacenter is now registered into Eco4Cloud dashboard.

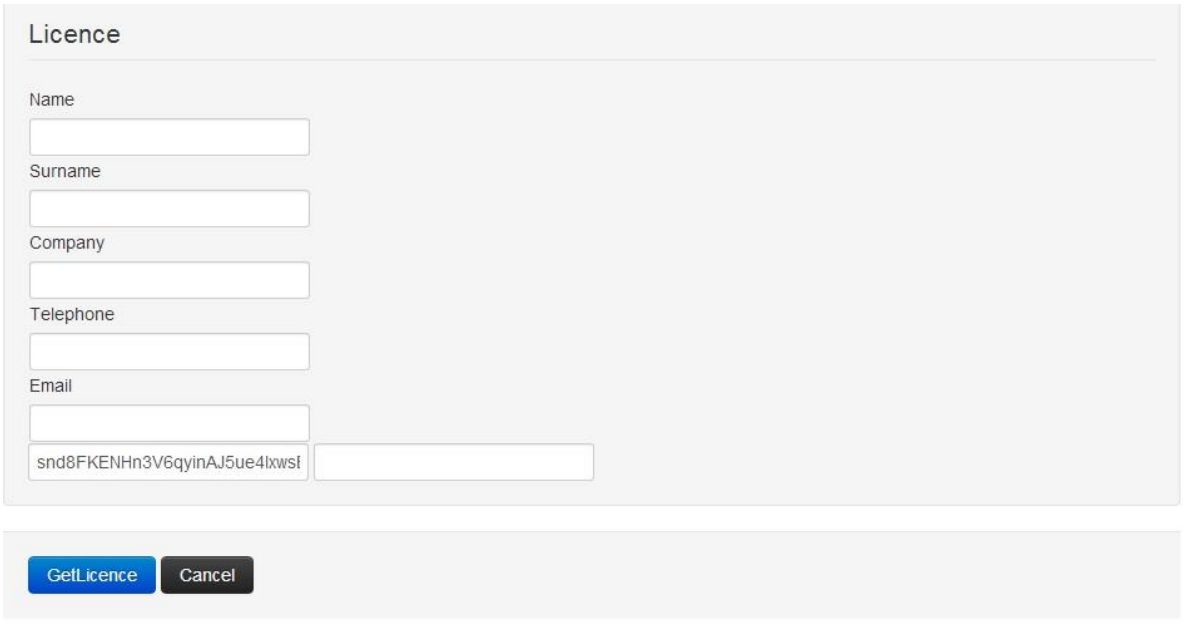


Fig. 33 Activation license

HYPERVISOR

Each Eco4Cloud virtual appliance is attached to a VMware vCenter. A single Eco4Cloud dashboard, however, can gather information from several vCenters, the only prerequisite is to connect the dashboard to the Eco4Cloud virtual appliances installed through the data center(s).

The button Hypervisor in fig. 32 opens another page that shows and allows to add or modify hypervisor (vCenter) configurations into the datacenter.

In the hypervisors page, a list of set up hypervisors is shown, and it is possible to update hypervisors information or register new hypervisors, in order to be monitored and optimized by Eco4Cloud.

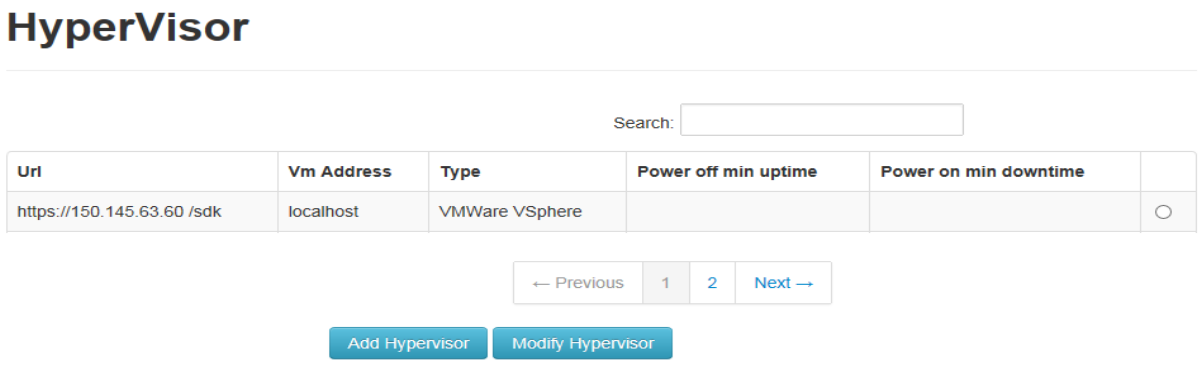


Fig. 34 Change Hypervisor settings

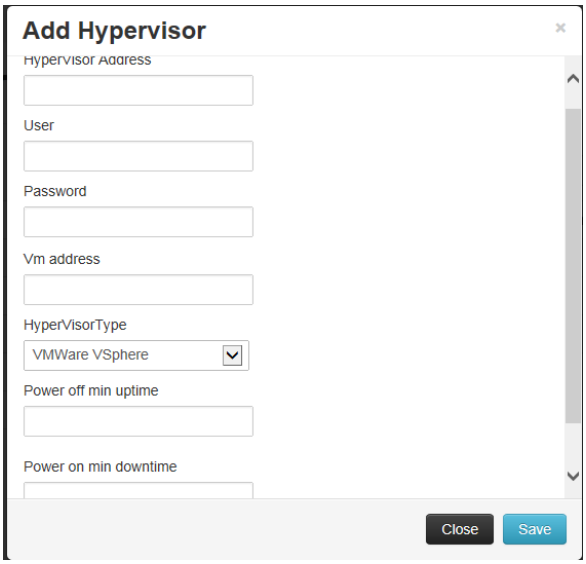


Fig. 35 Add Hypervisor

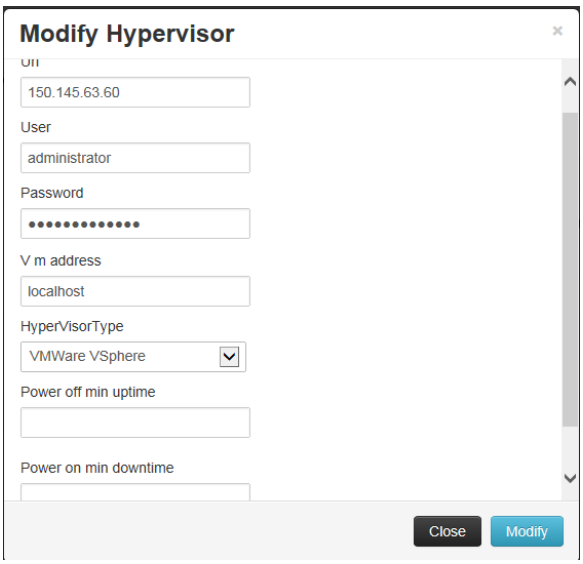
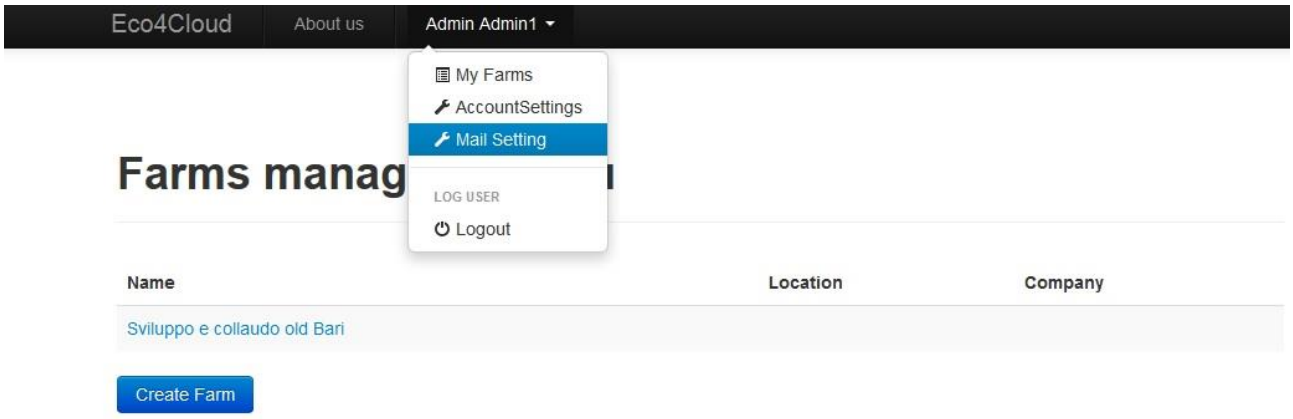


Fig. 36 Add Hypervisor

- Hypervisor address, user and password – information needed to properly connect the dashboard and the underlying virtualization platform;
- Power Off min uptime – minimum number of minutes of activity before a host can be powered off;
- Power On min downtime – minimum number of minutes of inactivity before a host can be powered on;
- VM Address: IP address of the Eco4Cloud virtual appliance running in the hypervisor;
- Hypervisor type: allows to select the proper hypervisor (i. e. VMware vSphere, Microsoft Hyper-V, Citrix, …)

Mail Configuration

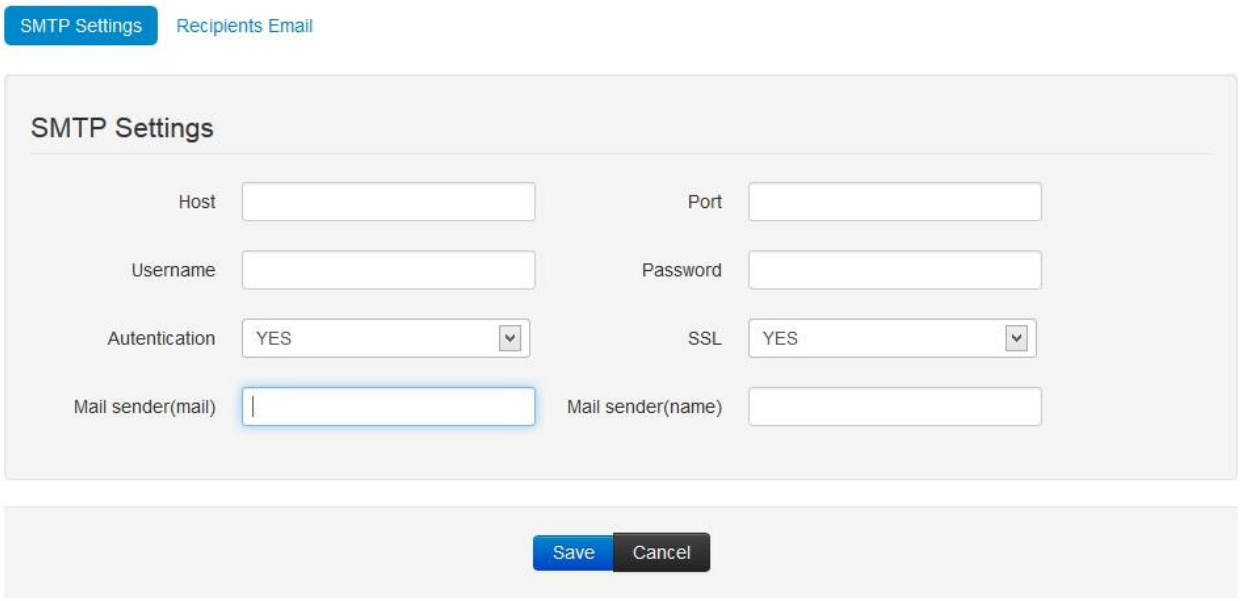
Eco4Cloud sends periodical reports of its activity and immediately notifies users of possible malfunctions. In order to obtain this service, the user needs to configure the mail service. This can be done by clicking on Mail Setting option in the user menu.



SMTP CONFIGURATION

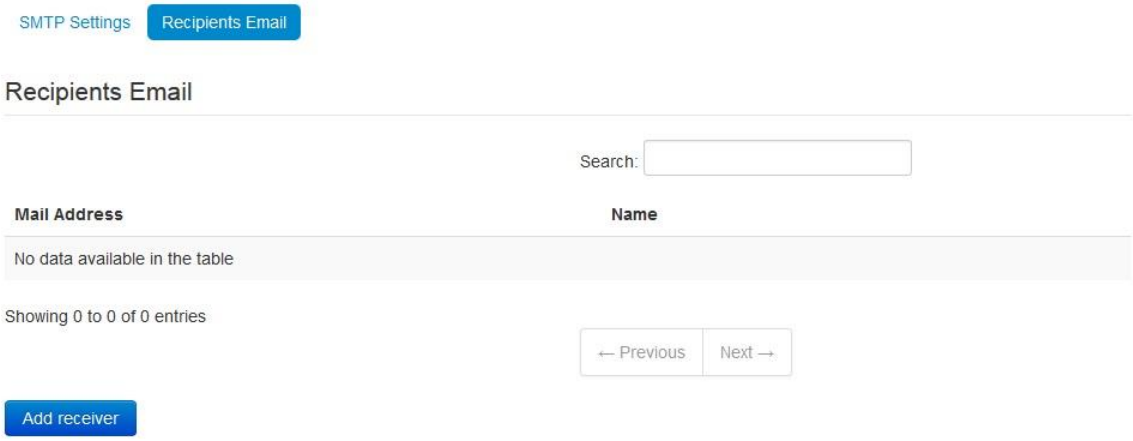
SMTP server configuration can be completed by filling the form in the SMTP Setting section with the login data for the available mail server.

MAIL CONFIGURATION



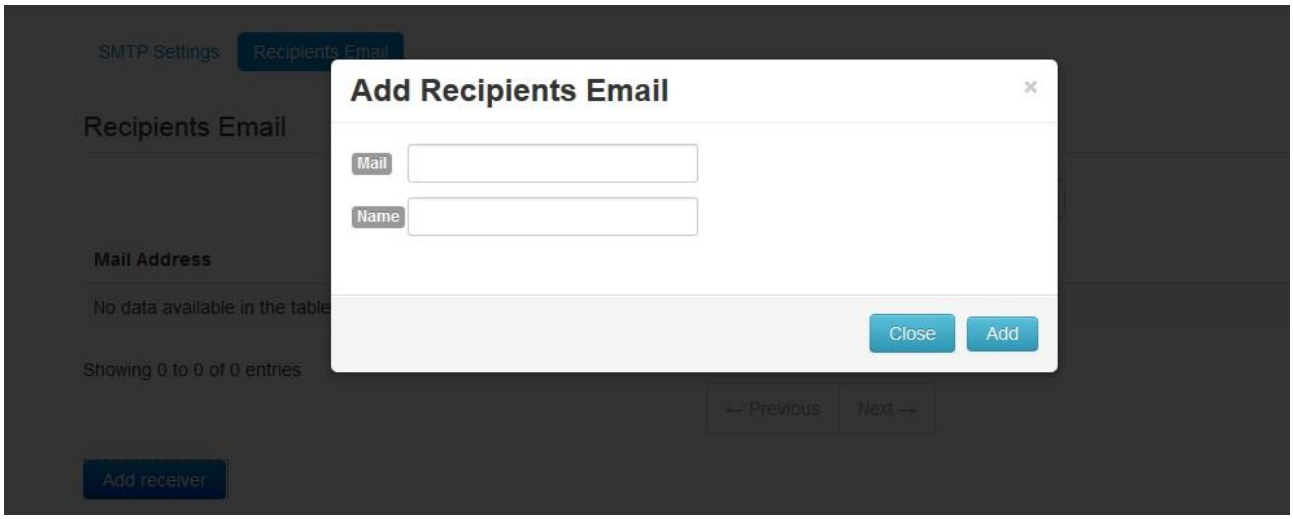
MAIL RECIPIENTS

It is also possible to insert several recipient for Eco4Cloud reports and notifies, in the Recipients Mail section.

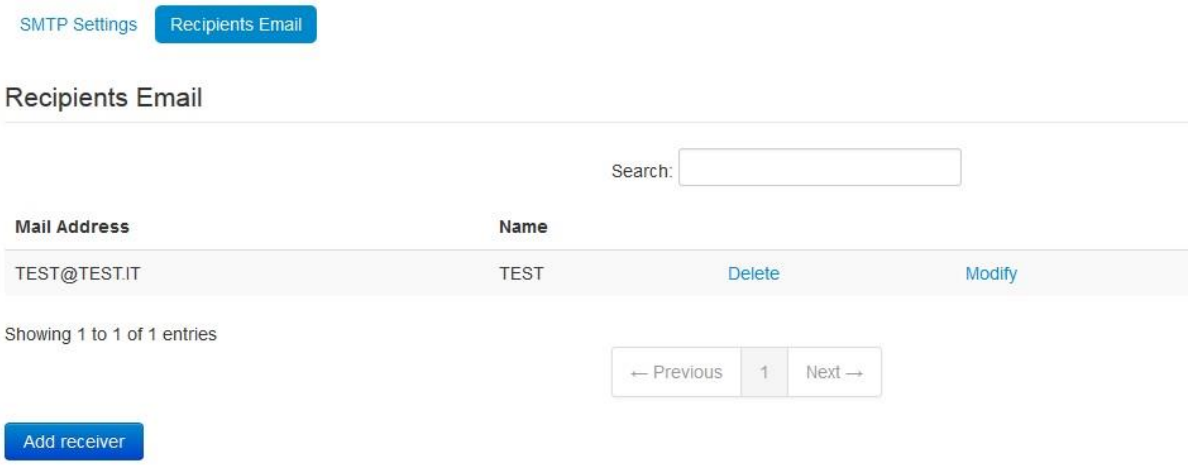


The section lists the recipients and gives the possibility to insert other ones by pressing Add Receiver button.

MAIL CONFIGURATION



Specifiy both name and email addres for each recipient. The section also to modify/delete a recipient.



Datacenter performances

Clicking the “Check usage data” button, the user can analyze datacenter performances with 4 different perspectives, namely: “Table”, “Spatial”, “Tree”, “Chart”. It is always possible to switch from one perspective to another using the related dropdown menu. Also, a “Customize” option is available, and makes it is possible to customize data included in each perspective. Moreover, it is possible to change the number of servers and clusters shown for every column and row in spatial perspective.

Table perspective

The table layout is divided by cluster: a list of cluster is shown, and when selecting a cluster, a table with all performance data by the servers contained in the cluster appears. The fields are coloured so that they show the servers’ load.

It is possible to sort data according to each column of the table.

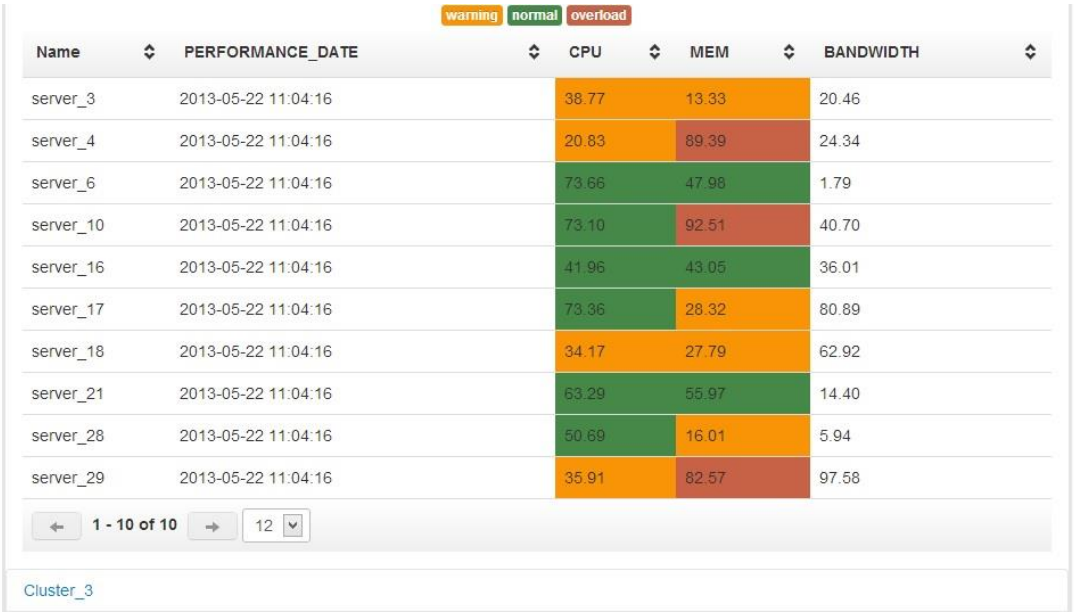


Fig. 37 Table perspective

Spatial perspective

The Spatial perspective is a datacenter top-down view. For each cluster a “cloud” is shown, containing all the servers within the cluster. Each server, with its color, shows its load level.

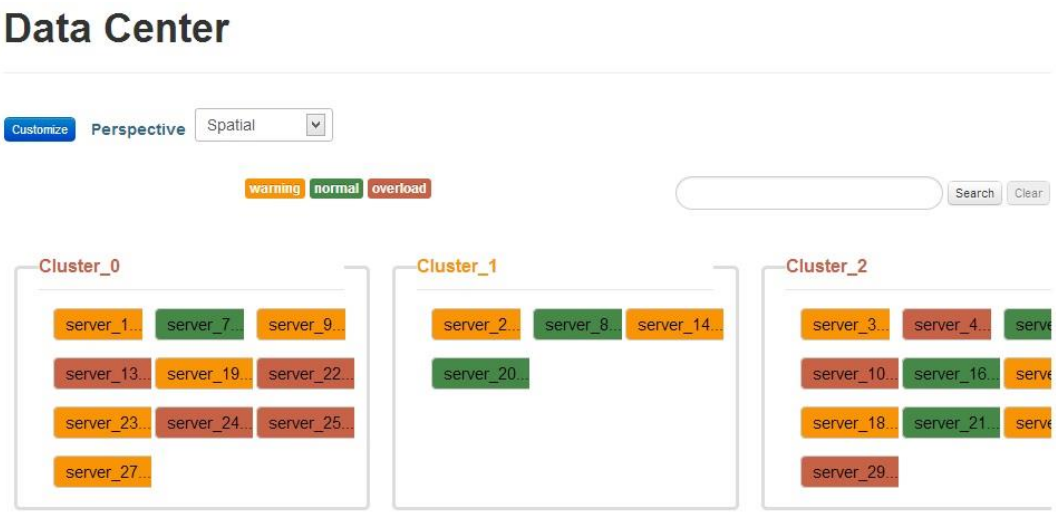


Fig. 38 Spatial perspective

Tree perspective

The datacenter is represented in a 3-level tree structure. The root node is the datacenter itself, second level nodes represent clusters, with the proper color, according to their load. Each cluster has its children nodes, representing the servers running in the specific cluster. Again, each server appears with the proper color, according to its load.

Fig. 39 Tree perspective

DATACENTER PERFORMANCES

Chart perspective

The chart perspective shows recent performances by all the servers in the datacenter. The default time interval in the charts is a week. The charts are zoomable, so it is possible to focus on a different time interval, and their data can be filtered, in order to analyze only specific servers. The charts show utilization level of CPU and RAM memory.

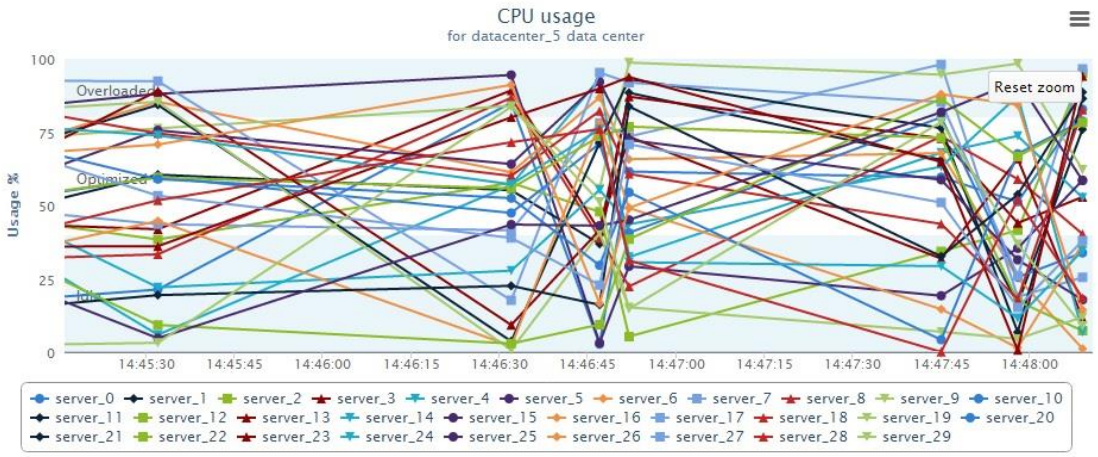


Fig. 40 Chart perspective – CPU usage chart

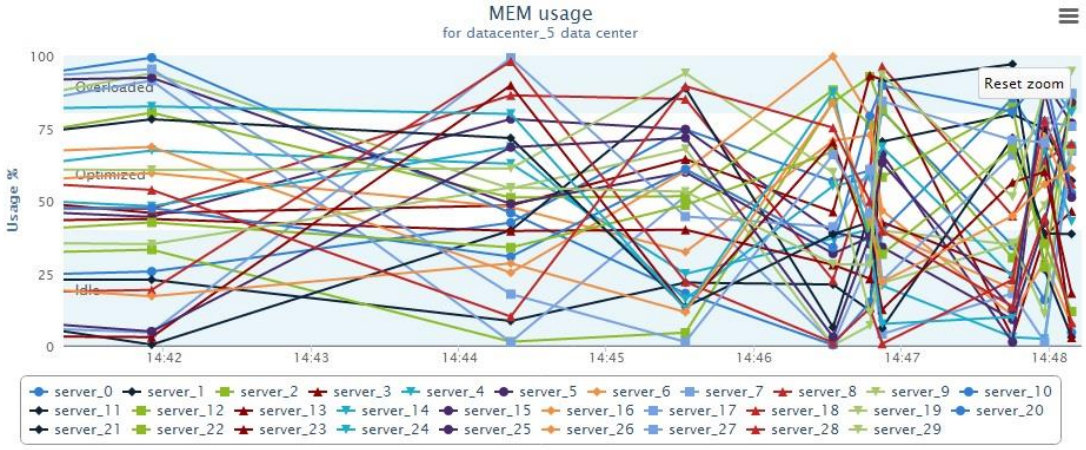


Fig. 41 Chart perspective – Ram usage chart

Search

In every perspective, the search function is available, and the search requested persists even after a change of perspective. The search works with an autocomplete menu.

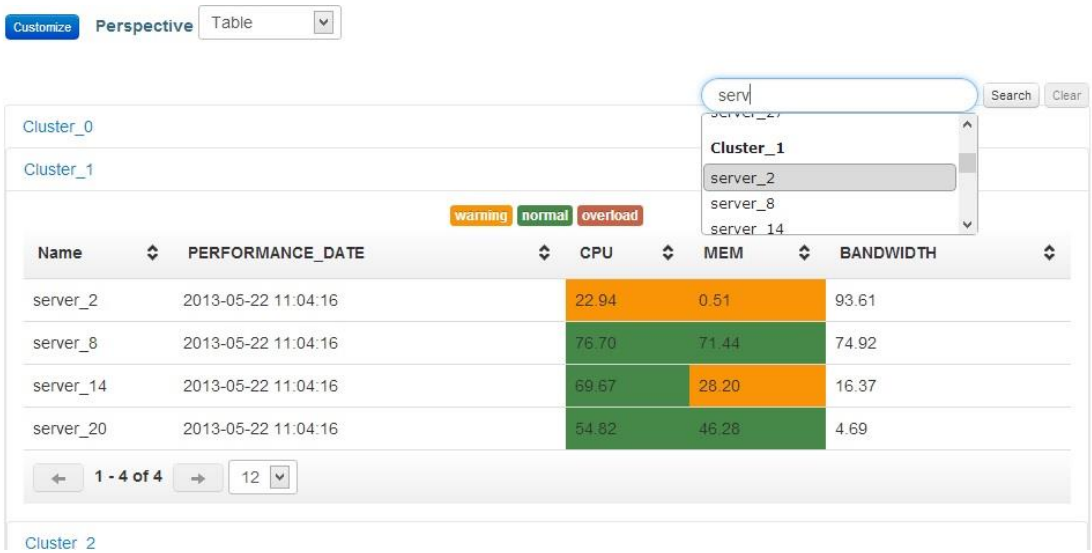


Fig. 42 Search function

Consolidation constraints

The configuration tab in the datacenter page includes a set of global parameters, both related to the hypervisor and the consolidation algorithm (i. e. TA and TH). A set of consolidation constraints is available related to specific clusters, servers and virtual machines, each available with a specific tab.

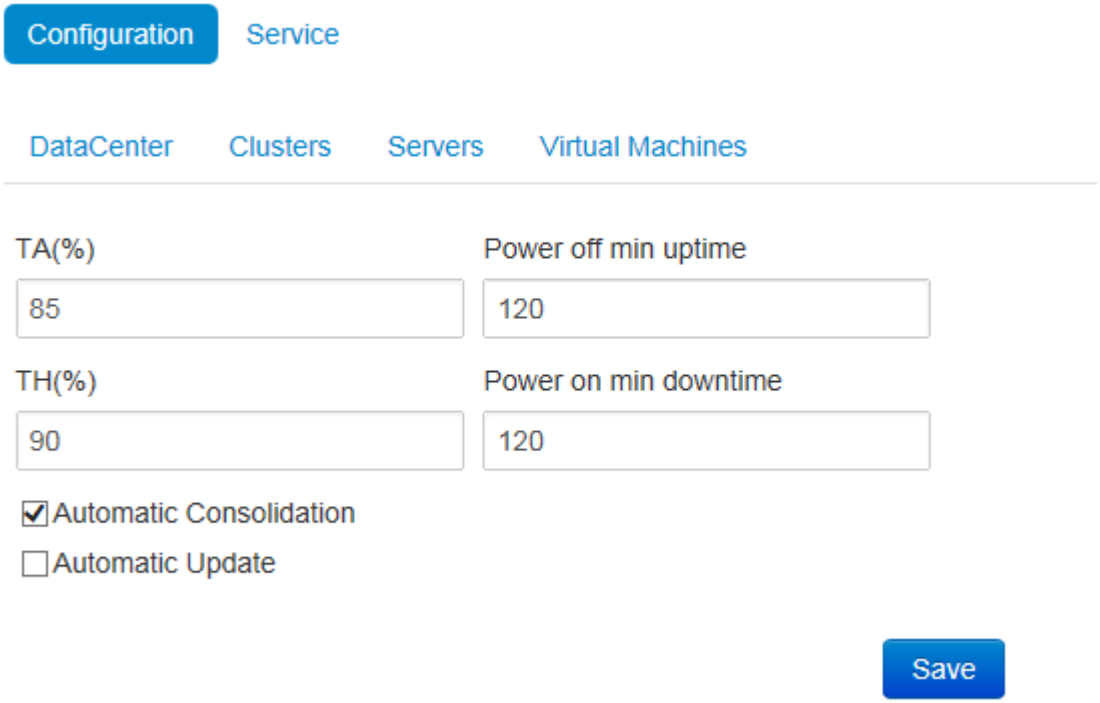


Fig. 43 Consolidation constraints

Once activated, it is possible to fill information about the data center.

- TA, the target percentage of servers' resource utilization to be reached through virtual machines consolidation;
- TH, the maximum percentage of servers' resource utilization to be reached through virtual machines consolidation. If the resource utilization goes above this threshold, virtual machines migrations will be issued to lower the utilization;
- Automatic Consolidation – activate or deactivate the virtual machines consolidation process;
- Automatic update – activate or deactivate vApp automatic update.

CONSOLIDATION CONSTRAINTS

CLUSTERS CONSOLIDATION CONSTRAINTS

It is possible to specify a minimum number of servers that must remain always active for high availability during the consolidation process.

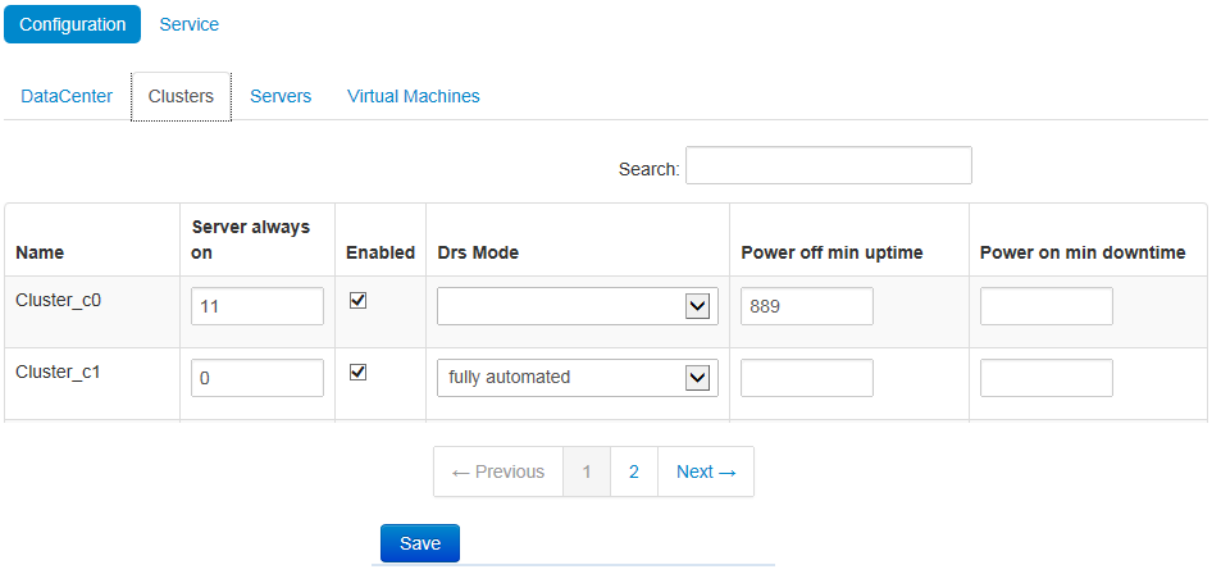


Fig. 44 Clusters consolidation constraints

- Power Off min uptime – minimum number of minutes of activity before a host can be powered off;
- Power On min downtime – minimum number of minutes of inactivity before a host can be powered on;
- DRS Mode – Manually, fully automated or partial automated

CONSOLIDATION CONSTRAINTS

SERVERS CONSOLIDATION CONSTRAINTS

It is possible to enable/disable the stand by of each server (enabled by default). Servers with standby disabled will tend to attract virtual machines and remain powered on with the virtual machines given up by the other hosts.

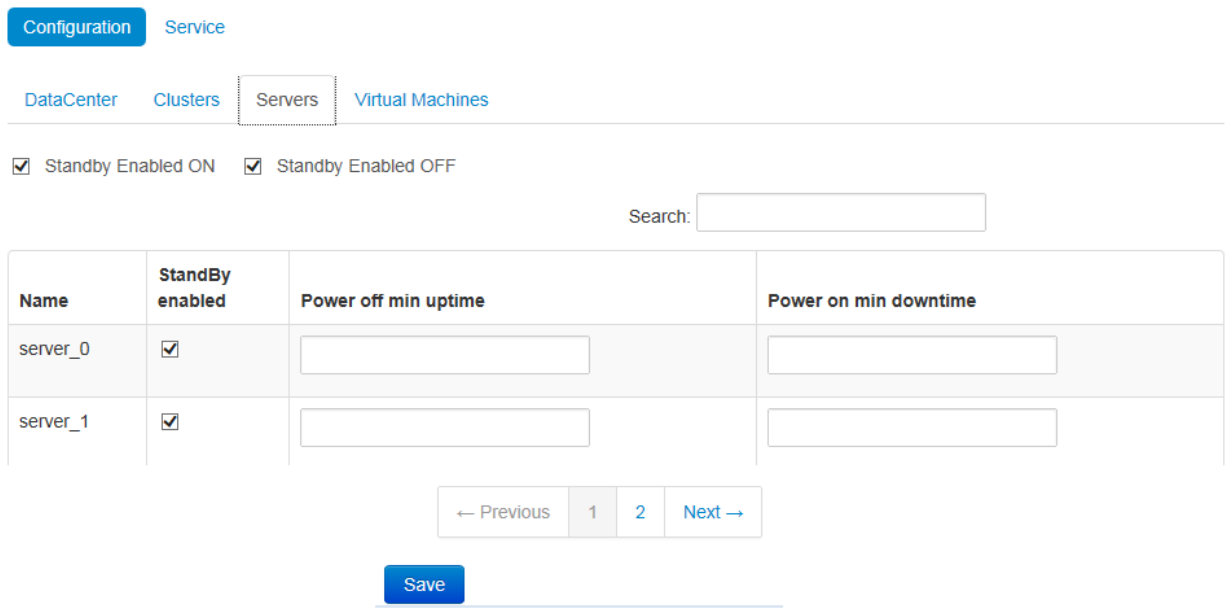


Fig. 45 Servers consolidation constraints

- Power Off min uptime – minimum number of minutes of activity before a host can be powered off;
- Power On min downtime – minimum number of minutes of inactivity before a host can be powered on.

CONSOLIDATION CONSTRAINTS

VIRTUAL MACHINES CONSOLIDATION CONSTRAINTS

It is possible to enable/disable migration of virtual machines within a cluster and/or among different clusters, as shown in figure 46.

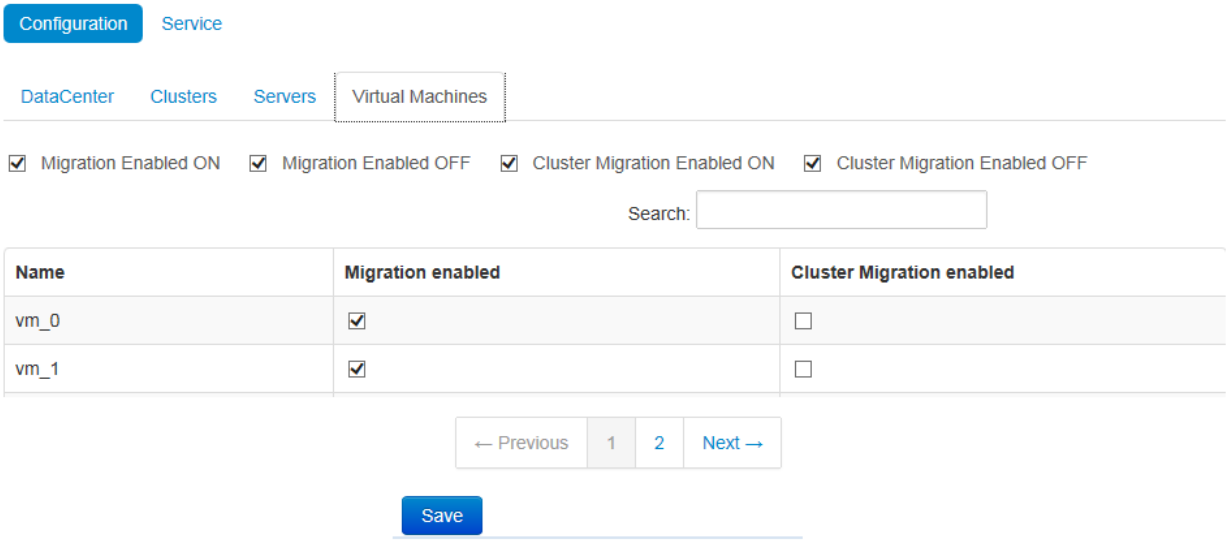


Fig. 46 Virtual machine consolidation constraints

Appendixes

APPENDIX A – PRIVILEGES

The following tables list the privileges that should be assigned to the Eco4Cloud user. When setting permissions, verify all the object types are set with appropriate privileges for each particular action. Some operations require access permission at the root folder or parent folder in addition to access to the object being manipulated. The best practice is to add privileges to the root folder in order to ensure the user has all the needed privileges all over the virtualized environment.

Requirements

Initially, a Windows user must be registered on the server where vCenter is installed with the name of **eco4cloud**. The user can be created locally if working on a stand-alone server or in the domain if working on an active directory environment.

Manual Role creation

In the section Home -> Administration -> Roles (Fig. A) a new role must be created with the set of privileges in the following. The name to assign to role will be **E4CRole**

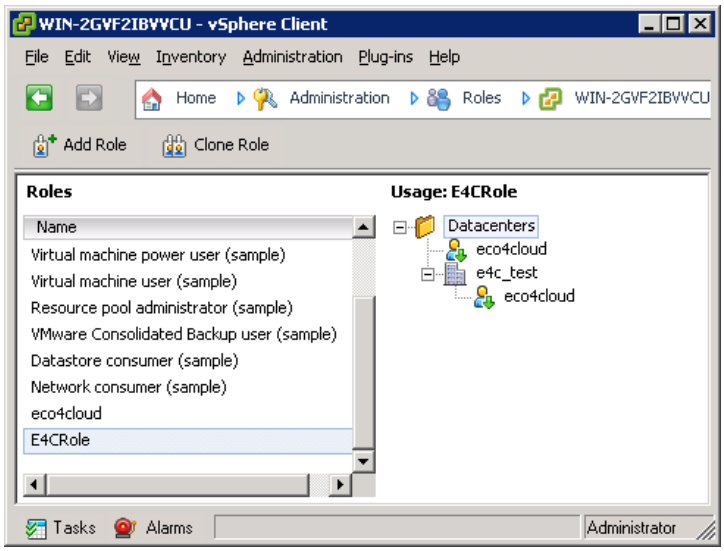


Fig. A Role creation

APPENDIXES

Automatic Role Creation by powershell script

We create two PowerCli scripts for automatic role creation:

1. CreateEco4CloudRole.ps1
2. CreateEco4CloudRole_PowerCLI4.0.ps1

The first one is for powerCli version 5.0 or above, the second one for Powercli version 4.0

The scripts can be used on the vCenter server locally or remotely from other PC with Powercli installed on.

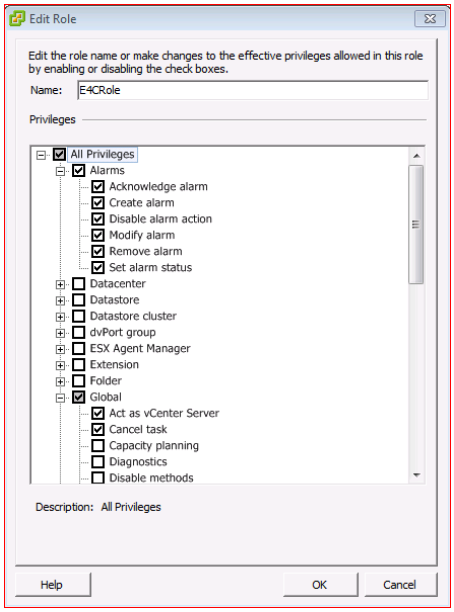
In local mode you have to open a PowerCli console with administrator permission and launch **CreateEco4CloudRole.ps1**. The script will create E4CRole with the necessary permissions.

In remote mode you have to open a PowerCli console and launch the same script with following parameters: vCenter Ip Address, vCenter administrator username and password

CreateEco4CloudRole.ps1 vCenterAddress vCenterUsername vCenterPassword

After creating E4CRole, you can add **eco4cloud** user account to the role.

Now it is possible to assign the needed privileges by clicking with the right button of the mouse on the name of the role.



Alarms privileges: control the ability to set and respond to alarms on inventory objects.

This class of privileges is useful to insert automatic alarms within the vCenter in case of overloads.

Acknowledge alarm: recognition of an alarm

Create alarm: creation of a new alarm.

Disable alarm action: block of the reaction to an alarm

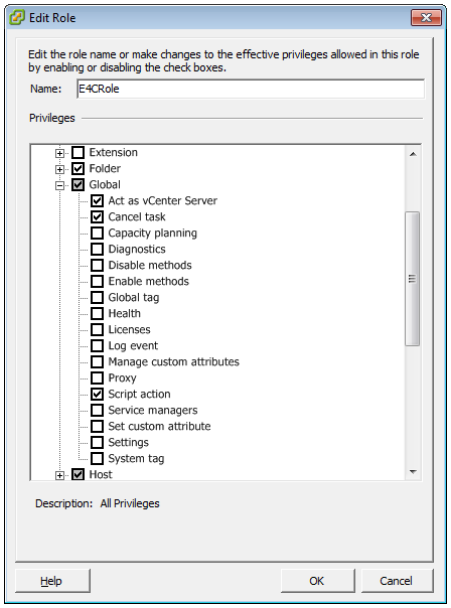
Modify alarm: modify of an alert object

Remove alarm: removal of an alert object

Set alarm status: modify the status of an alarm to Normal, Warning, or Alert

Act as vCenter Server: Prepares or starts a vMotion

Fig. B Alarms



Cancel task: Cancels an executing task

Act as vCenter Server: Prepares or starts a vMotion

Cancel task: Cancels an executing task

Script Action: Schedule a scripted action in conjunction with an alarm.

Fig. C Global

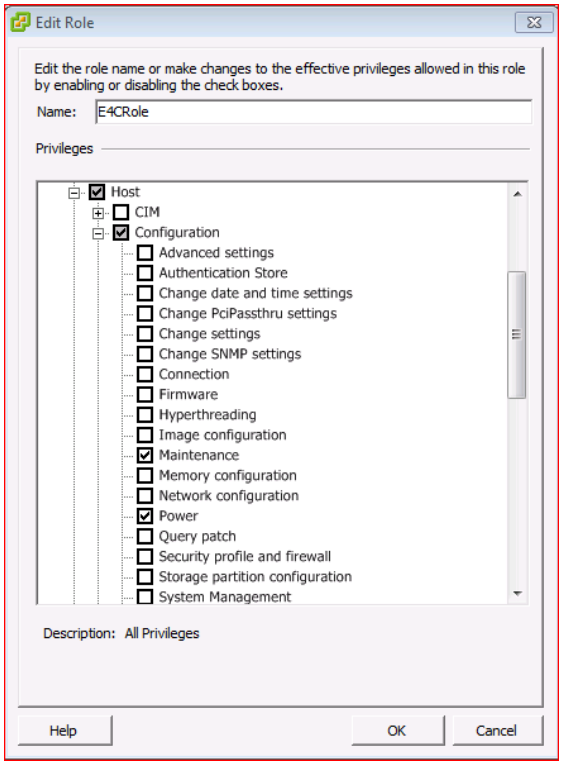


Fig. D Host: configuration

Privileges **Host->configuration**: in this section privileges for hosts configuration are set.

This class of privileges is useful to put hosts in maintenance mode or power them down.

Maintenance: allows to put a host in maintenance mode for administrator tasks, such as update and reconfiguration, and allows to power down and reboot a host.

Power: configuration of energy savings settings.

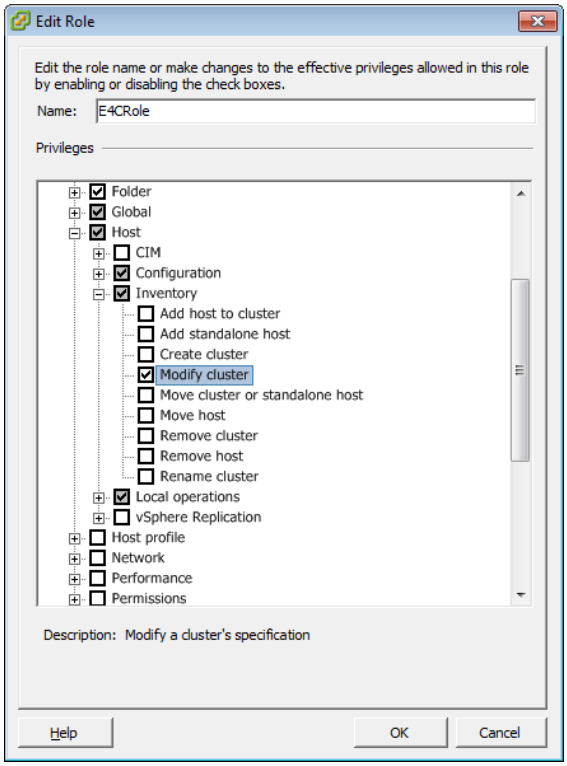


Fig. E Host: Inventory

Privileges **Host->inventory**: in this section privileges for hosts inventory are set:

Host inventory privileges control adding hosts to the inventory, adding hosts to clusters, and moving hosts in the inventory. So it is required to put a cluster in partially/fully automated or manual mode

Modify cluster: Change the properties of a cluster.

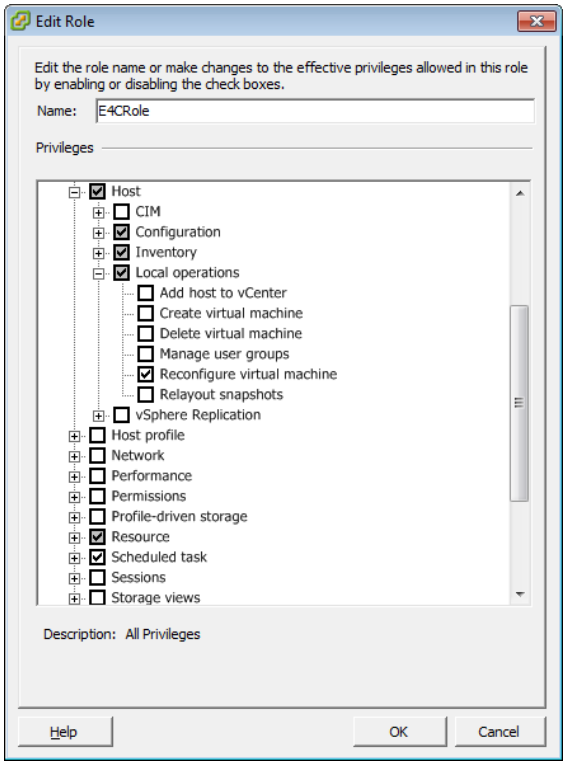


Fig. F Host: Local Operations

Privileges **Host->Local Operations**: controls action executed when vSphere Client is directly connected to a host.

This class of privileges is needed by the "smart ballooning" module, because the module should modify VM memory resources limits.

Reconfigure virtual machine: reconfgure virtual machine memory limits

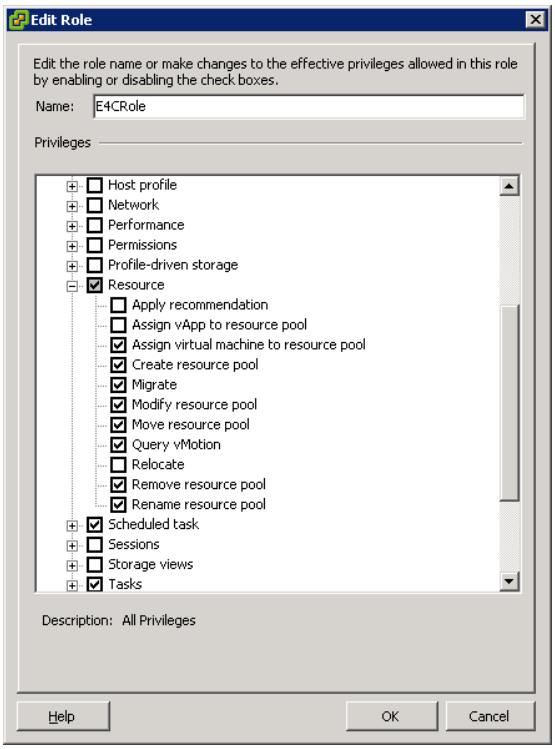


Fig. G Resource

Privileges **Resource**: controls resources pool and virtual machines migrations.

Assign virtual machine to resource pool: Assign a VM to a specific resource pool

Create resource pool: resource pool creation

Migrate: VM migration to a resource poll or a host

Modify resource pool: modificare pool di risorse

Move resource pool: spostare un pool di risorse

Query vMotion: verify compatibility of a VM to a target host for vMotion

Remove resource pool: cancel a resource pool

Rename resource pool: rename a resource pool

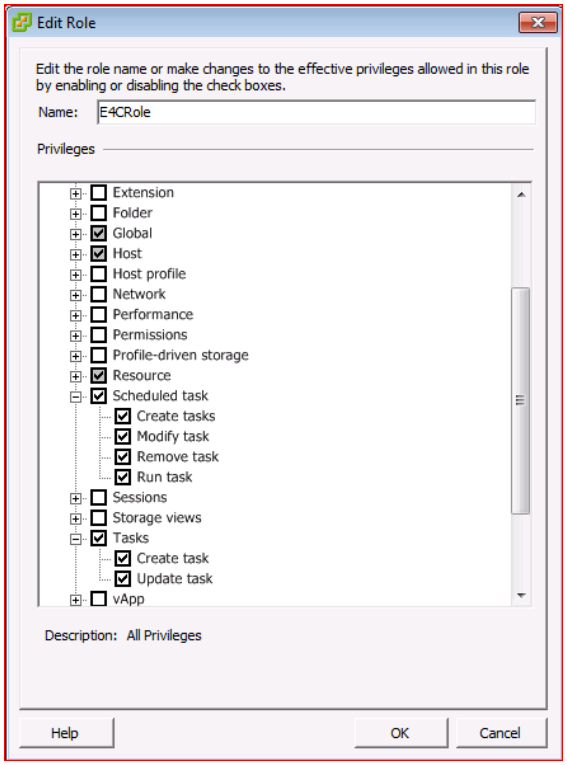


Fig. H Tasks and Scheduled task

Privileges **Scheduled Task**: control the ability to create, modify and removed scheduled tasks.

Create tasks: create a new scheduled task

Modify task: modify a scheduled task

Remove task: remove a scheduled task

Run task: run a scheduled task

Privileges **Tasks**: control extensions ability to create and update activities on vCenter server.

Create task: allows an extension to create a user defined task.

Update task: allows an extension to modify a user defined task.

This class of privileges are useful to schedule needed operations to VM consolidation.

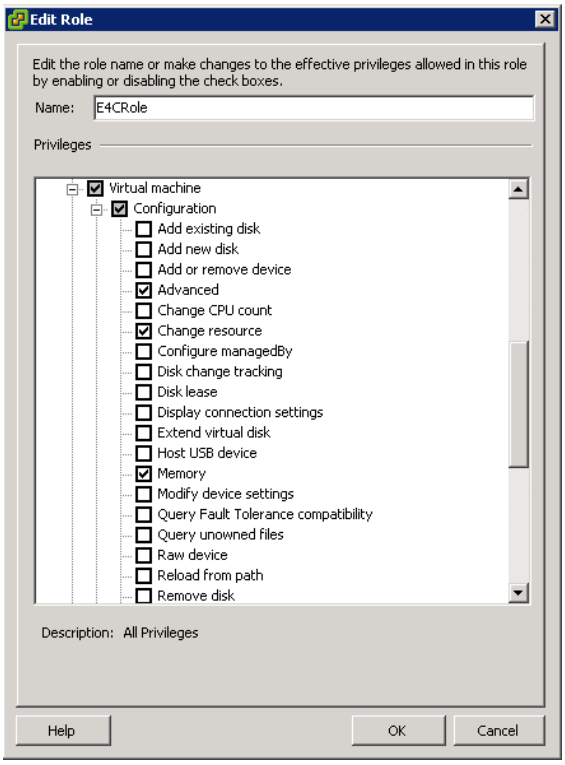


Fig. I Virtual Machine: configuration

Privileges **Virtual Machine -> configuration**: control the ability to configure VM and devices options.

Advanced: add or modify advanced options in VM configuration file.

Change resource: Change resource configuration of a set of VM nodes in a given resource pool. It is required for the use of the Smart Ballooning .

Memory: modify the allocated memory to the VM.

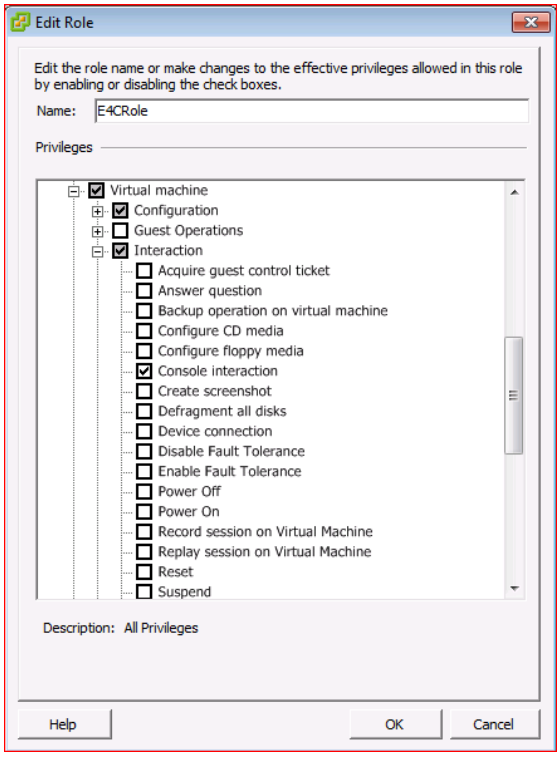


Fig. L Virtual Machine: Interaction

Privileges **Virtual Machine -> Interaction**: control the ability to interact with VM console, configure media, execute power up/down operations and install VMware Tools.

Console Interaction: interaction with VM, using mouse, keyboard and monitor.

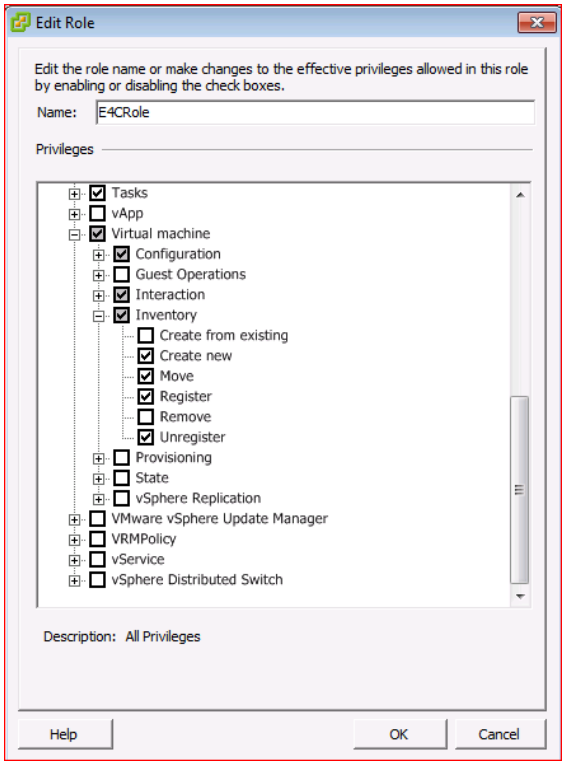


Fig. M Virtual Machine Inventory

Privileges **Virtual Machine -> Inventory**: control the ability to add, move and remove VMs.

This class of privileges is needed to issue vMotions.

Create new: Create a new VM

Move: move a VM in the hierarchy

Register: add a VM to vCenter server or host inventory

Unregister: remove a VM to vCenter server or host inventory

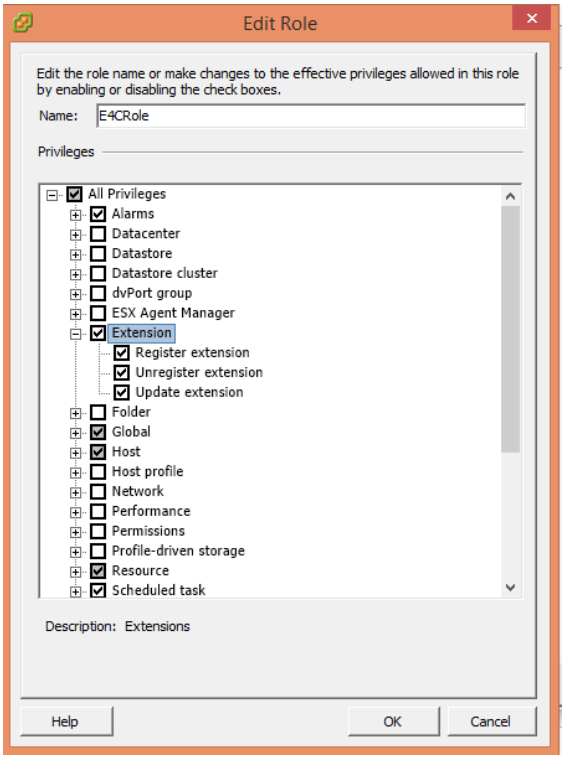


Fig. N Extension

Privileges **Extension**: control the ability to install and manage plug-ins

This class of privileges is needed to use Eco4Cloud Plug-in

Register extension: Registers an extension (plug-in)

Unregister extension: Unregisters an extension (plug-in)

Update extension: Updates an extension (plug-in)

APPENDIXES

APPENDIX B – IMPORTANT NOTES ABOUT ECO4CLOUD SOFTWARE

During normal operations, eco4cloud software will generate two scheduled tasks

1. "HypervisorLifeChecker"
2. "E4C Crash Detection Task"

And an alarm:

1. "E4C Crash Detection Alarm"

These tasks and alarms are needed to allow normal vCenter operation in case of failure of eco4cloud or in case vApp doesn't reach vCenter. **These tasks and alarms must not be canceled.**